Railway Engineering and Maintenance

THE P. & M. CO.

CAGO • NEW YORK • DENVER • WASHINGTON • ST. LOUIS • CLEVELAND • ST. PAUL • BOSTON • SAN FRANCISCO

MEXICO D. F.

"We shall welcome our friends to our suite at the Palmer House during the A. R. E. A. Convention in Chicago, March 14, 15 and 16."

FULLY COMPRESSED — 20,000 LBS. (FOR 1" BOLT)

.030" RELEASE — APPROX. ¼ BACK TURN — APPROX. 5500 LBS.

FULL RELEASE — REACTIVE RANGE APPROX. .140"

Xtra-hy

hy-crome SPRING WASHERS

keep track bolts tighter *even* longer

Designed to safely exceed the new A. R. E. A. specifications for rail joint bolts, Reliance Xtra-hy Hy-Crome Spring Washers do an important job in cutting main line maintenance costs.

Reliance Xtra-hy Hy-Cromes fit the splice bar wherever Reliance Hy-Pressure Hy-Crome Spring Washers have been used and require no increase in bolt length. Their greater reactive range and increased reactive pressure keep track joints *tighter* EVEN *longer.*

Complete information and samples will be sent upon request.

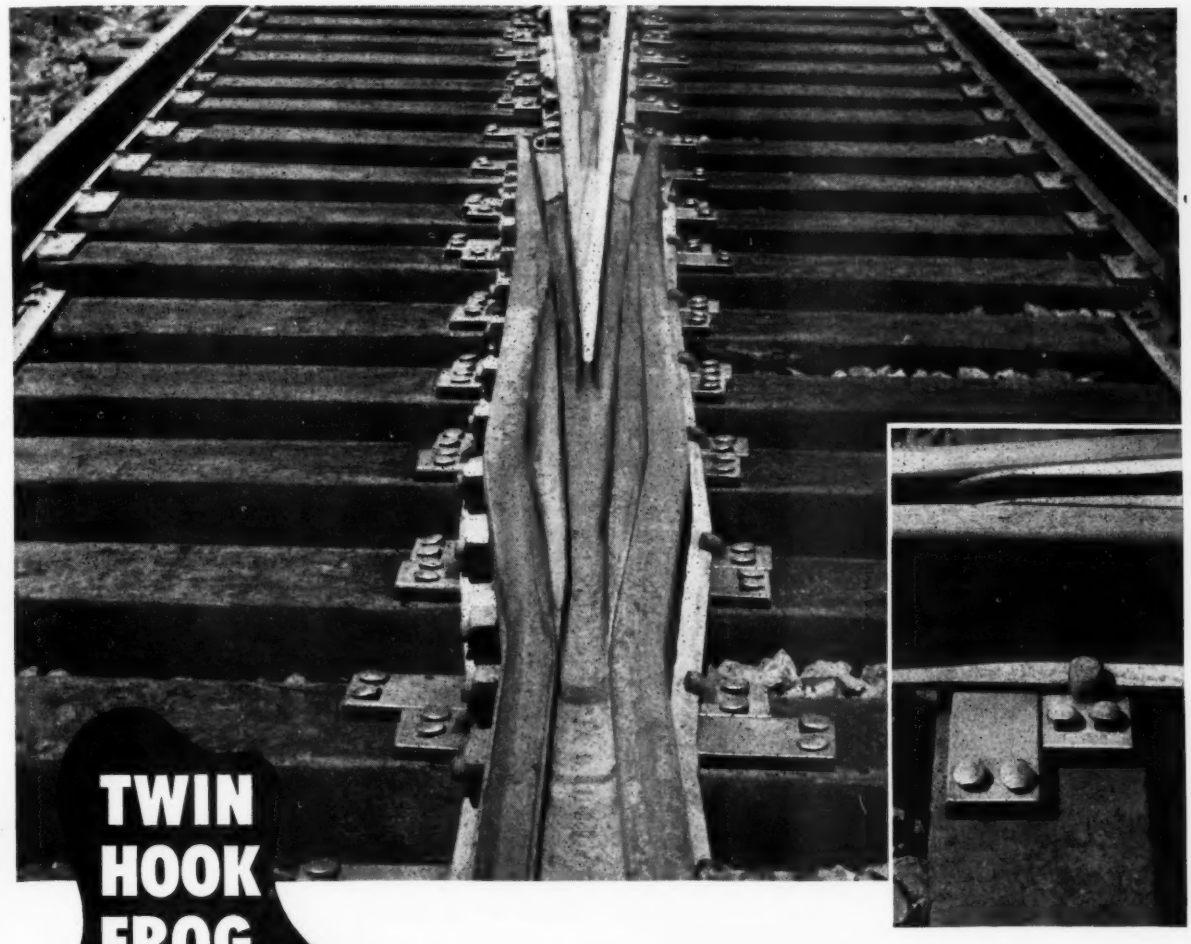
Reliance Xtra-hy Hy-Crome Spring Washers can be furnished in ¾", ⅞", 1", $1\frac{1}{16}$" and 1⅛" Bolt Sizes.

EATON

EATON MANUFACTURING COMPANY

EATON **RELIANCE DIVISION, MASSILLON, OHIO**

Sales Offices: New York, Cleveland, Detroit, Chicago, St. Louis, San Francisco, Montreal



TWIN HOOK FROG PLATES are easier to work with

(They do a better job, too!)

It's so easy to install Bethlehem's Twin Hook Frog Plates—nothing to it at all. And once in place, they really *anchor* the frog with a tight, uniform grip on both sides.

These plates are always used in pairs, never as single units, and each is equipped with a big, sturdy forged hook. Note the arrangement, as shown in the pictures. Because of the twin-plate feature, the distance between hooks can be altered at will. Thus any mating pair of plates can be adjusted to fit several *different* tie positions as well as frog angles. You don't have to stock a large and confusing variety of special plates, one for every position.

What are the advantages of the forged hook? Well, for one thing, it slips easily over the base of the frog and eliminates spiking at that point. It's bigger and stronger than an ordinary spike head, too . . . resists thrust more effectively and holds hard against lifting.

The whole story is too long to be told here, but Folder 390 contains many helpful details. Write for a free copy; it will be mailed to you promptly.

Standard Twin Hook Plates are made in 23-, 27-, and 31-in. lengths.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast
Bethlehem products are sold by
Bethlehem Pacific Coast Steel Corporation

Export Distributor:
Bethlehem Steel Export Corporation

BETHLEHEM STEEL

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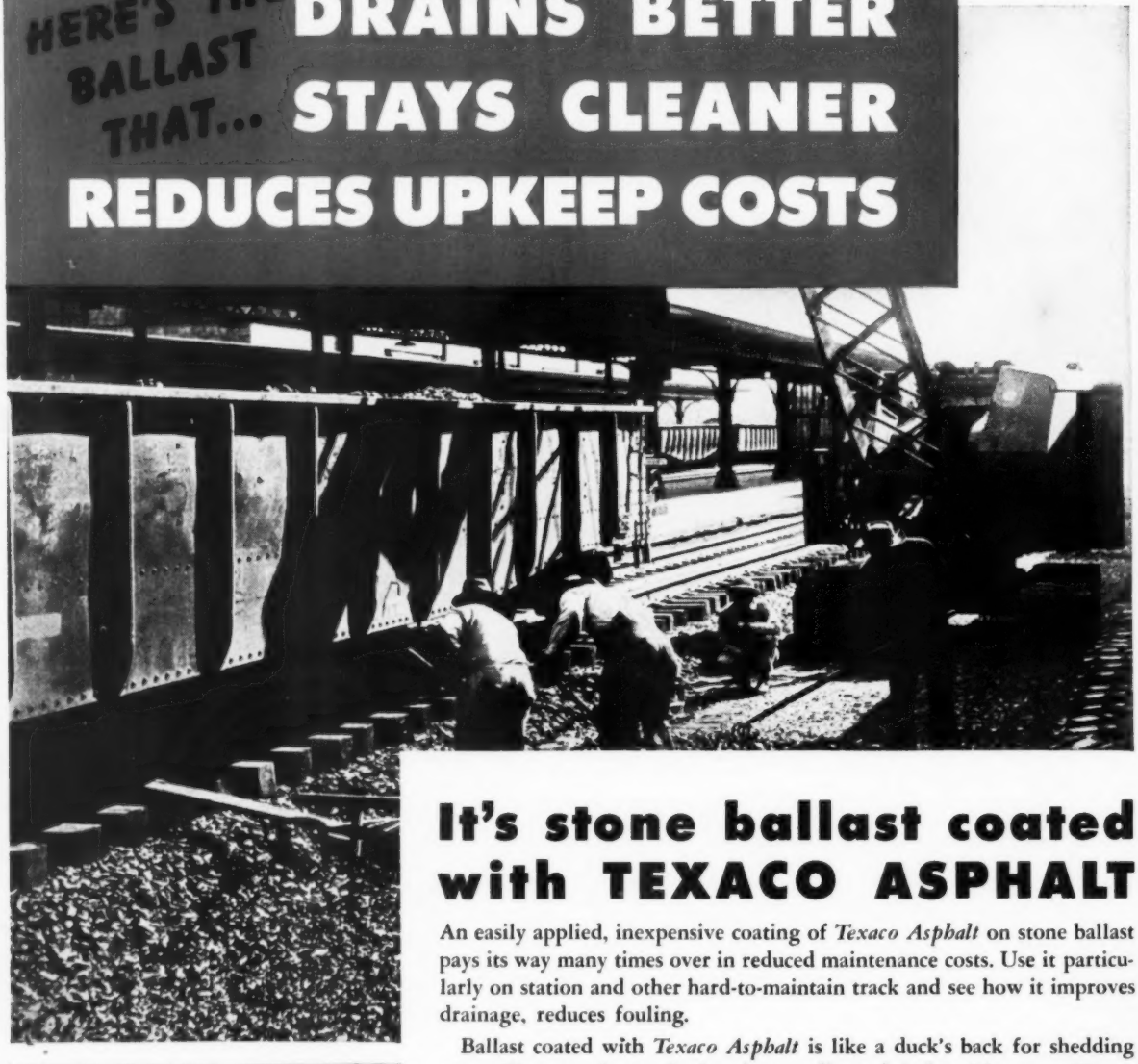
HERE'S THE BALLAST THAT... DRAINS BETTER STAYS CLEANER REDUCES UPKEEP COSTS



It's stone ballast coated with TEXACO ASPHALT

An easily applied, inexpensive coating of *Texaco Asphalt* on stone ballast pays its way many times over in reduced maintenance costs. Use it particularly on station and other hard-to-maintain track and see how it improves drainage, reduces fouling.

Ballast coated with *Texaco Asphalt* is like a duck's back for shedding water, like a new broom for keeping out dirt and cinders. Moreover, *Texaco Asphalt* keeps the ballast flexible, will not crack under traffic. Track stays in line and on grade for years with minimum attention.

Just be sure you use *Texaco Asphalt*. Its superior qualities – which make it ideal for railroad use – have been proved by more than 40 years of service on America's roofs, streets, and highways.

For the full story of lower track maintenance costs with *Texaco Asphalt*, call the nearest Railway Sales office listed below, or write The Texas Company, *Railway Sales Department*, 135 E. 42nd St., New York 17, N. Y.

2 MORE TEXACO AIDS TO LOWER MAINTENANCE COSTS

1. Eliminate soft track by asphalt-cement pressure grouting, using *Texaco No. 24 Emulsified Asphalt*. Assures longer-lasting stability.
2. Keep rail joints from freezing, kinking, corroding, by using *Texaco Rail Joint Lubrication*. Applied under traffic and without taking down joints.

NEW YORK • CHICAGO • SAN FRANCISCO • ST. PAUL • ST. LOUIS • ATLANTA

TEXACO REG. T.M.

TEXACO Asphalt for Coating Ballast

TUNE IN . . . TEXACO presents MILTON BERLE on television every Tuesday night. METROPOLITAN OPERA radio broadcasts every Saturday afternoon.

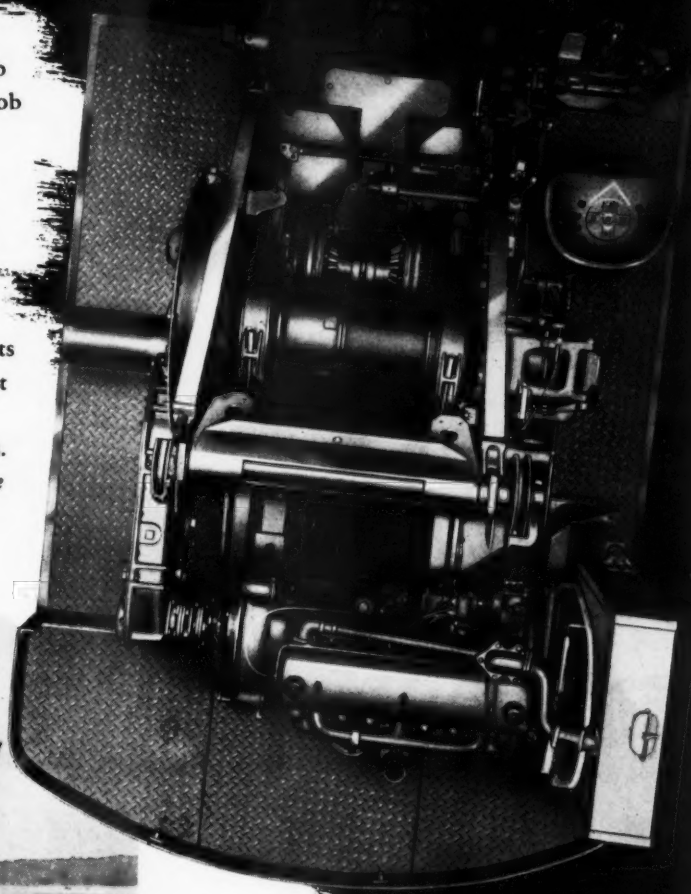
SIMPLICITY of DESIGN

DOES mean lower cost

HAVE you considered the problem of equipment upkeep in relation to your cranes? Look at the deck of a Northwest. It is clean. Only two main shafts. Few gears. Few adjustments. It is easy to care for. It means less "down time". Conversion, too, from Crane to Dragline, Shovel or Pullshovel is easier. It means less time wasted in changing basic machines to the right one for the job and it means less likelihood of the crew trying to do a job with the wrong equipment.

When you add to this basic advantage all the other Northwest advantages — the Cushion Clutch, the Uniform Pressure Swing Clutches, the Northwest Dual Independent Crowd, Ball and Roller Bearings on all High-Speed Shafts, along with many other cost cutting features, it is no wonder that so many Northwests are serving America's great railroads — And, don't forget the "Feather-Touch" Clutch Control. It means easy operation with greater safety and without complications. Your Northwest *can't be shut down out on the line because of control failure.*

NORTHWEST ENGINEERING CO.
1513 Field Building
135 South LaSalle Street, Chicago 3, Illinois



Widening right-of-way on the Chicago, Milwaukee, St. Paul & Pacific Railroad

NORTHWEST

THE ALL PURPOSE RAILROAD MACHINE

HERE IT IS !!!!

THE 1950 MODEL

JACKSON

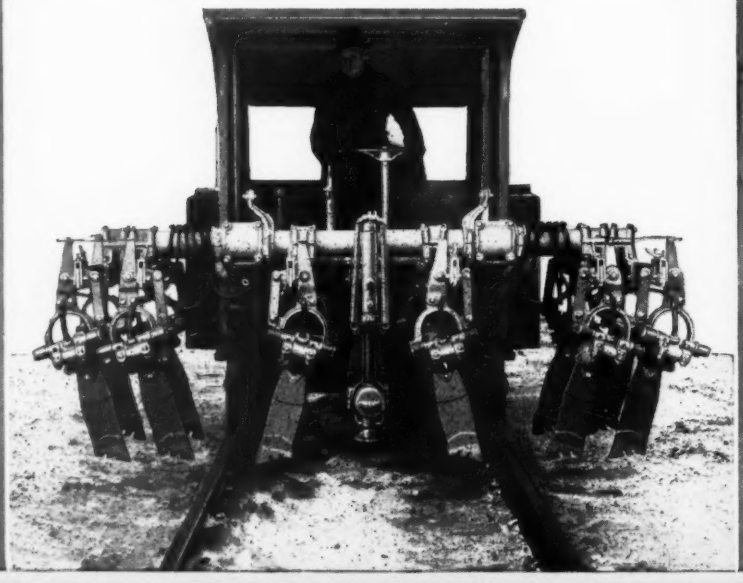
MULTIPLE TAMPER

Stepped-up in speed of operation . . . greatly improved in those mechanical details that assure longevity and freedom from trouble (the result of three years of careful observation of operations in the field) . . . and provided with weather protection for the operator, the Jackson Multiple Tamper's previous wide margin of superiority as the best means of putting up perfect track at the lowest cost per mile, has been greatly increased in the 1950 model. Note the more important improvements listed at the right. Consider the fact that Jackson field engineers assist supervisory personnel, on initial installations, to perfect organization and methods that assure maximum results. Investigate, if you will, the actual performance records of the Jackson Multiple Tamper on any of the many roads on which it is being used. Then, we feel sure, you are bound to agree that nothing approaches the 1950 Jackson Multiple Tamper for producing finished track of highest quality at lowest cost.

*THE ONLY TAMPER WITH WHICH PERFECT TRACK CAN BE

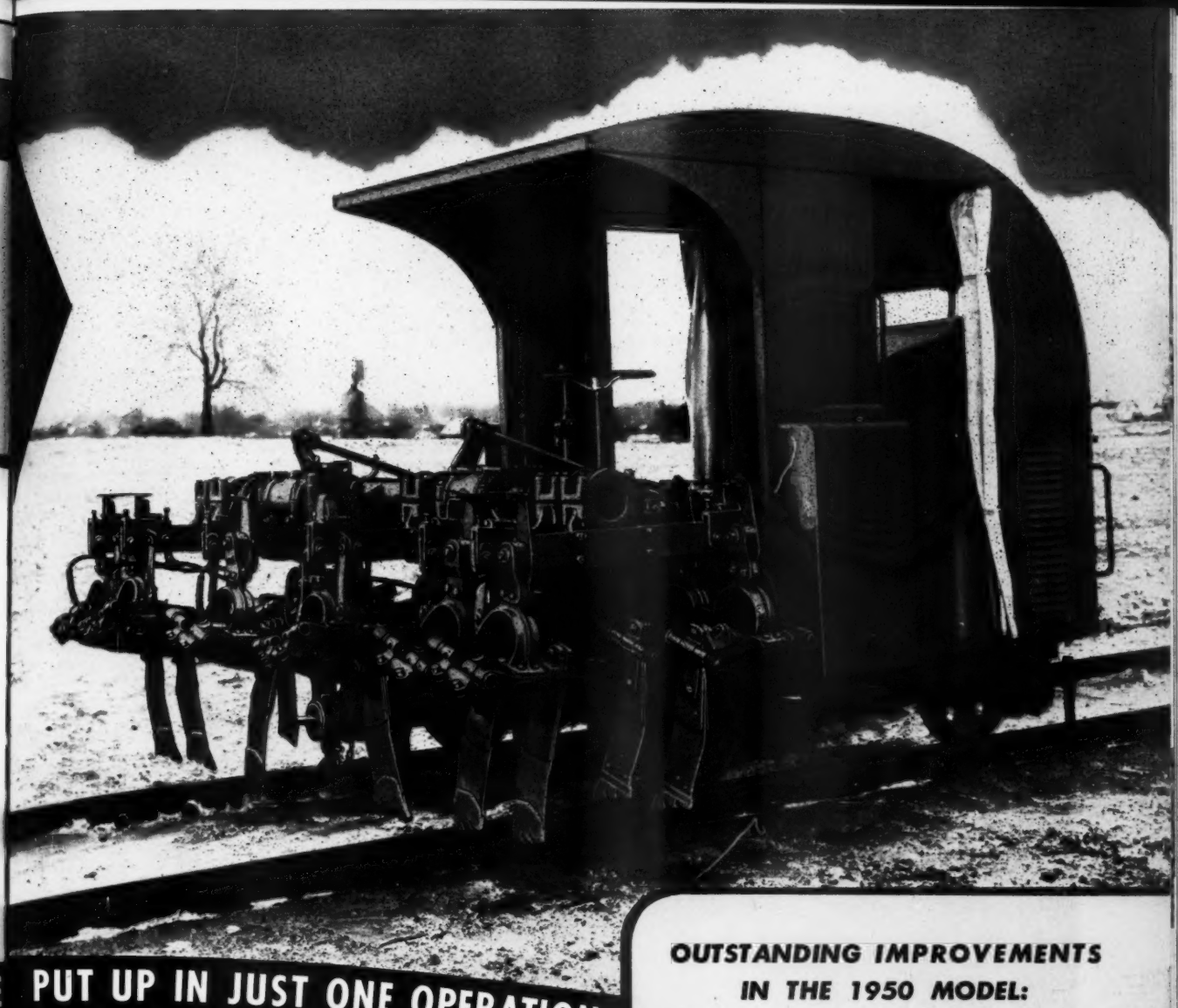
*In the vast majority of operations no spot tamping or follow-up of any kind is necessary.

Note the high degree of visibility both forward and through the rear of the cab.



Upper half of the cab may be quickly and easily removed for handling with crane — replaced for weather protection.

ELECTRIC TAMPER & EQUIPMENT COMPANY



PUT UP IN JUST ONE OPERATION

LUDINGTON, MICHIGAN

OUTSTANDING IMPROVEMENTS IN THE 1950 MODEL:

1. Larger, More Powerful Engine
2. Heavy Duty Transmission
3. Improved Hydraulic Pump of Greater Capacity
4. Externally Packed Rams
5. Improved, Positive, Quickly Adjustable Tamper Suspension
6. Demountable Cab
7. Larger Fuel Tank
8. Improved Tamper Blades and Tips
9. Greater Speed of Operation

"What do you mean?"

"When that car was re-decked five years ago, we omitted pressure-treatment from the specifications because we didn't think we could afford the forty dollars that pressure-treatment would have cost."

"Well, we had to keep maintenance costs down."

"That's just the point . . . we don't keep maintenance costs down when we go in for expensive economies. But, can we afford *not* to invest forty dollars more in pressure-treatment with a life expectancy of three or four times what we're getting now with untreated lumber? Now we have to pay for another re-decking job that pressure-treatment would have eliminated by giving us ten more years of service. That would have paid for the forty dollars a number of times over."

"That looks like sound logic to me. We'll have to stop thinking of pressure-treatment as a cost . . . it's really an investment *that pays worth-while dividends."*

• • •

Why not let us give you . . . without obligation . . . an analysis and report on what these savings, through pressure-treatment, can be for your railroad? Your inquiry will receive prompt attention.

KOPPERS **PRESSURE-TREATED WOOD**

KOPPERS COMPANY, INC., Pittsburgh 19, Pa.

The New TRUE TEMPER RAIL ANCHOR

Photo courtesy Great Northern Railway Company

FOR INCREASED ECONOMY AND EFFICIENCY

CHECK THESE 5 FEATURES

- Cannot be overdriven
- Especially adapted to worn and corroded rail bases
- Ease of application
- Ease of removal
- Efficient on re-application

Made and sold only by

TRUE TEMPER Corporation

Railway Appliance Division

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TRUE TEMPER

ALSO MAKERS OF TRUE TEMPER RAIL FORKS • RAIL JOINT SHIMS • BALLAST FORKS • TRACK SHOVELS • SCOOPS • SCUFFLE HOES • AXES • HAMMERS • HATCHETS • SCYTHES • WEED CUTTERS

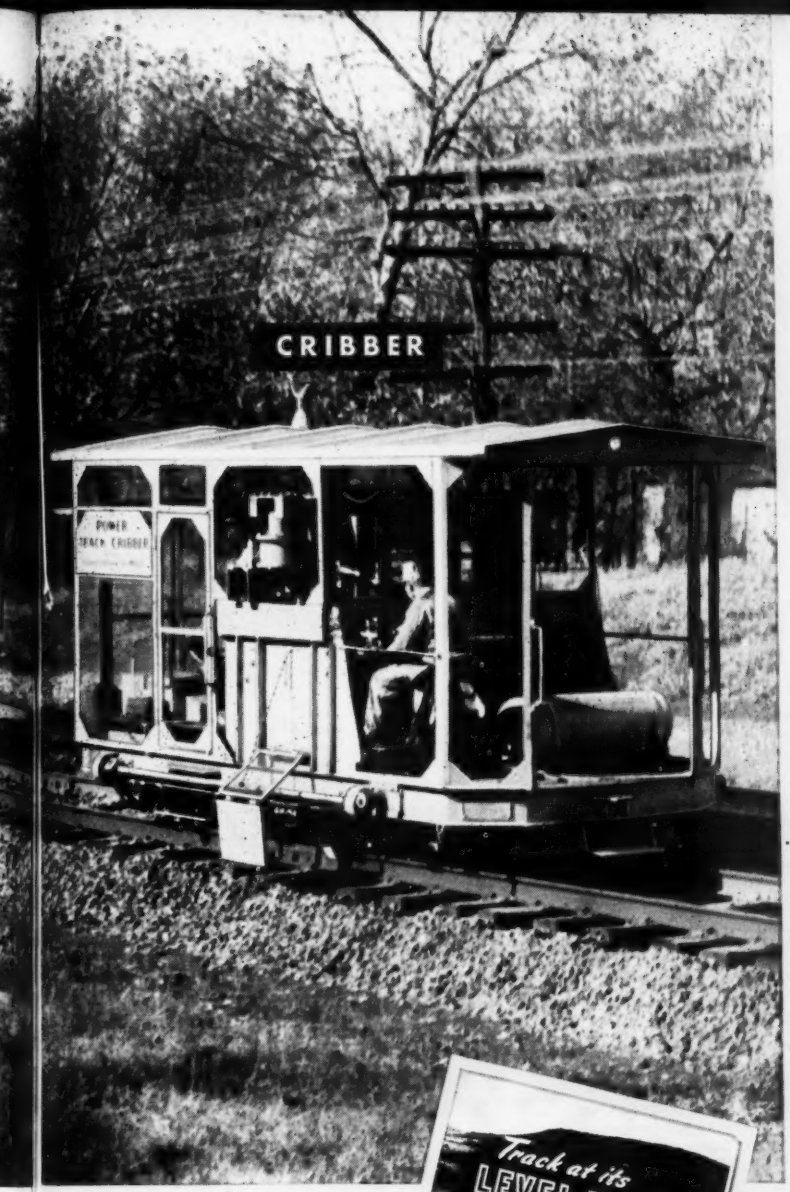
WORLD PREMIERE IN TRACK MAINTENANCE

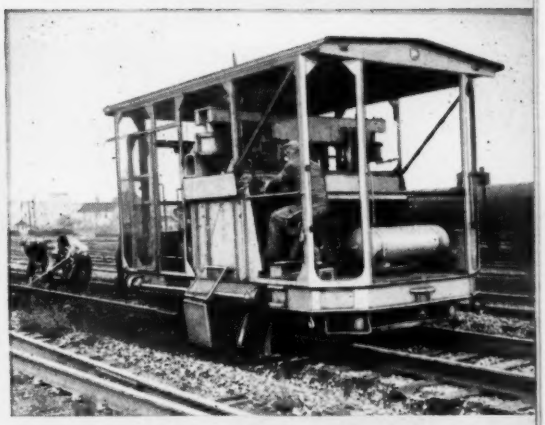
Pullman-Standard units team up for production-line efficiency, speed, and economy in cribbing, ballast-cleaning, and tamping.

● Here is a "first" in track-maintenance history! *Four* Pullman-Standard machines staged this dramatic demonstration recently, on the main line of the Michigan Central District, New York Central System, near Gary, Ind. With these machines a gang of *only 24 men* (including 4 operators, foreman, and assistant foreman) cribbed out track, cleaned ballast, and tamped ties, at the rate of *450 to 600 feet per hour!*

Two Pullman-Standard Power Track *Cribbers* led the procession, working three rail lengths apart. They were followed by the new Pullman-Standard *Ballast Cleaner*, which scooped up and screened out the fouled ballast. Completing the sequence of operations, the veteran Pullman-Standard Power Track *Ballaster* rolled on to tamp the track.

Used thus in combination, to give track the "full treatment" where necessary—or operated independently as conditions indicate—these machines are *proved money-savers*. For that reason, railroads are urgently invited to inquire about the flexible policy which now makes them available *in three ways:* (1) by outright purchase; (2) on installment terms; (3) by rental, with option to buy. Full particulars will be promptly supplied.





CRIBBING—The Pullman-Standard Power Track Cribber can crib out from 170 to 250 feet of track per hour, depending on the ballast condition. Typical case history: hand-cribbing cost per mile, $2,000.00; with Power Track Cribber, $430.00; saving per mile, $1,570.00.

CLEANING—The Pullman-Standard Ballast Cleaner can clean both crib and shoulder ballast (both shoulders at once) without fouling adjacent tracks. Experience under actual service conditions indicates savings in line with those reported for the Power Track Cribber and Ballaster.

TAMPING—The Pullman-Standard Power Track Ballaster can tamp approximately 500 track feet per hour, more firmly and uniformly than by any other method. Typical case history: cost per mile with power hand tools, $1,470.00; with Power Track Ballaster, $422.40; saving per mile, $1,047.60.

Write for a copy of "Track at Its Level Best." This profusely illustrated 24-page brochure supplies detailed information on all the Pullman-Standard machines shown here. Data-file size; valuable for reference.

Pullman-Standard

CAR MANUFACTURING COMPANY

POWER BALLASTER DIVISION

79 East Adams Street, Chicago 3, Illinois

BIRMINGHAM 3, 1004 First National Building
CLEVELAND 15, 907 Midland Building
PITTSBURGH 19, 1115 Gulf Building
NEW YORK 17, 52 Vanderbilt Avenue
WASHINGTON 6, D. C., 1025 Connecticut Avenue, N. W.
SAN FRANCISCO SALES REPRESENTATIVE: MARK NOBLE

For mechanization of maintenance-of-way operations

"ON THE SPOT" COMPRESSED AIR

Mobile CP Crawler Compressor, propelling itself in either direction, keeps up with the job, dispensing with long air piping.

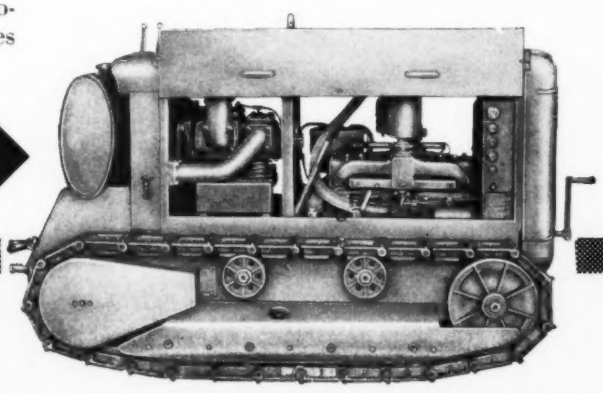
It will travel between or across rails, or on track shoulder; climb grades to 40%; turn around on its own center; not tip over at a 45° angle; propel itself onto a flat car or handcar. Available in sizes of 105 and 160 c.f.m. actual capacity.

CP Flanged-Wheel Mounted Compressors, gasoline-driven or Diesel-driven, are furnished in sizes of 105, 160, 210, 315 and 500 c.f.m. capacity.

CP PATROL COMPRESSOR

Easily transported; front and rear retractable dollies facilitate tight-spot, single-rail handling "on track;" give 4-point support "off track." Air-cooled engine and compressor are designed for year-round operation.

For nipping, small rises, and jobs where track is raised several inches, CP-3D Tie Tampers are ideal.



The mechanization of maintenance-of-way and structures work is the fastest-moving development in railroading today. Keeping pace with this development, Chicago Pneumatic offers a wide variety of air compressors, and pneumatic and electric tools, to speed maintenance operations. Write for complete information.

GETS UNDER FROGS AND SWITCHES

Compact engine design and slender lower end, permitting unobstructed view of work, make CP-5 Gasoline Tie Tamper ideal for use in narrow places.

Starts quickly by pressure on one of the grip handles. Balance is perfect, its weight being centered between grip handles. Air-cushioning of piston return stroke minimizes vibration. Efficient magneto ignition; no batteries to replace. Standard two-cycle engine operates on gasoline-oil fuel mixture, providing automatic lubrication.

SAVES HOURS OF NUT-RUNNING TIME

There's no quicker or easier way to run nuts, and to apply or remove bolts, studs, and lag screws, than with a CP Reversible Impact Wrench. No twisting or kick-back, and minimized vibration lessens operator fatigue. Models from ½" to 2" bolt size.

REMOVES RUST RAPIDLY

Rust, scale or paint is rapidly removed from any metal surface with pneumatically operated CP Wire Brush Machine.

CHICAGO PNEUMATIC TOOL COMPANY

General Offices: 8 East 44th Street, New York 17, N. Y.

AIR COMPRESSORS • PNEUMATIC TOOLS • ELECTRIC TOOLS • ROCK DRILLS
DIESEL ENGINES • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

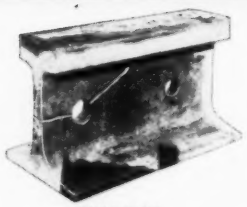
NOW SPERRY RAIL SERVICE *Announces*

ULTRASONICS

FOR TESTING RAIL-IN-TRACK

THESE RAIL DEFECTS INSIDE THE JOINT BARS

TYPICAL HEAD AND WEB SEPARATION

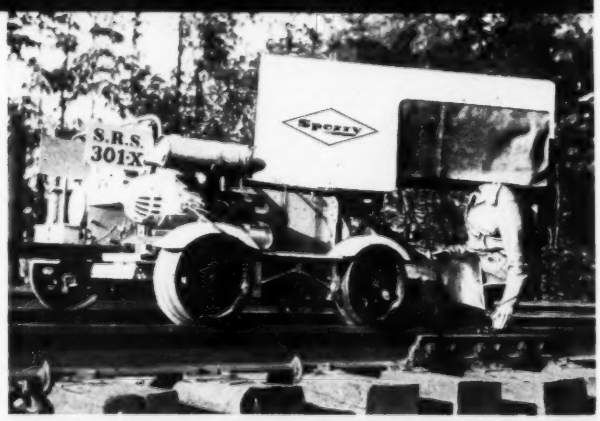


TYPICAL BOLT HOLE CRACK

BOLT HOLE CRACK BROKEN OUT IN SERVICE

ARE ACCURATELY DETECTED AS TO LOCATION, TYPE AND SIZE

Of rails tested to date at the joints, 2 % to 34% have been found defective. May we send you Technical Data Sheet 02-716 showing results of typical tests?



Sperry

FIRST IN RAIL TESTING

SPERRY RAIL SERVICE

DIVISION OF SPERRY PRODUCTS, INC.

DANBURY, CONNECTICUT

NEW YORK, N. Y. CHICAGO, ILL. ST. LOUIS, MO.

It turns on a dime to save dollars

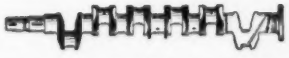
RAILWAY maintenance men like this "Caterpillar" D4 with Traxcavator because its extreme maneuverability helps them meet maintenance schedules. And like all "Caterpillar" matched teams, the rugged dirt-handling tool you see here cuts *down-time* to the bone. The right horsepower is matched to the job at hand to save on fuel, too.

This "Caterpillar" power package is building spur-line grade for the Minneapolis & St. Louis Railroad. Using a one-cu.-yd. bucket, it easily does 300 feet of finished grading a day! Among other uses, this turn-on-a-dime earthmover is ideal for snow removal, daylighting cuts, drainage work, and odd-job use in yards.

To find out how these "Caterpillar" matched teams can cut costs and save time to cure maintenance headaches, call your nearby "Caterpillar" dealer, or mail the handy coupon below!

CATERPILLAR TRACTOR CO., Peoria, Ill.

LOOK UNDER THE HIDE



Subject to thrust and shock, crankshafts must be rugged. "Caterpillar" crankshafts are superior quality steel forgings, accurately machined, weighed and balanced. Main bearings are on each side of crankpin journals. Large-radius fillets reduce stress concentrations while end thrust is absorbed on polished thrust surfaces. "Hi-Electro" hardened for maximum service life and Superfinished to within five-millionths of an inch of true surface smoothness, these crankshafts are tops in design and craftsmanship. Look under the hide for quality.

CATERPILLAR

REG. U. S. PAT. OFF.

DIESEL ENGINES • TRACTORS • MOTOR GRADERS
EARTHMOVING EQUIPMENT

CATERPILLAR TRACTOR CO.
Box RE-3, Peoria, Illinois

Please send me the latest booklet, "Green Light to Railroading Profits."

Name _____

Address _____

penta-protected chlorophenol

DECKING is

- **clean**
- **lasts longer**
- **will not leach**

Specify penta- chlorophenol

THE CLEAN WOOD PRESERVATIVE

It will pay you to treat your decking with PENTAchlorophenol—the clean wood preservative.

"PENTA" gives effective protection against decay. Moreover, its low solubility under severest moisture conditions assures protection that lasts through the years.

Specify the "clean" treatment for your decking and car lumber, as well as your ties, poles and wood platforms. For further information about PENTA write Dow, Dept. PE 35.

HOW "PENTA" PROTECTS TIES!

Newly adzed tie surfaces are protected by brushing or machine spraying with PENTAchlorophenol solution. This is easily done with PENTA, even in coldest weather.

THE DOW CHEMICAL COMPANY • MIDLAND, MICHIGAN

DOW

penta- chlorophenol

Behind the familiar face of any International engine or tractor grille lies rugged, low-cost power.

At left, an International T-9 crawler, with mounted 160-cubic-foot air compressor, supplies air for hammers and blowers forcing grouting material into a roadbed for greater stability. In 8,000 hours of operation, the power cost for fuel, lubrication and repairs on this unit was less than 46¢ an hour—proof of the advantage of putting International power on your jobs.

The "FACE" of Low-Cost Power

Powered by an International UD-9 Diesel Power Unit, the ditching machine, at right, gets its "drive" for less than 18¢ an hour for fuel and lubrication. No repairs have been needed by this engine in 4,000 hours of operation. The UD-9 has proved to be much more economical and trouble-free than the steam power it replaced.

Your International Industrial Power Distributor will be glad to show you the reasons why rugged power and rigid economy lie behind every International grille. You'll see the fastest way to put a bright face on your cost sheets is with dependable International tractors and International-powered equipment.

INTERNATIONAL HARVESTER COMPANY • Chicago

Tune in James Melton and "Harvest of Stars" —NBC, Sunday afternoons.

CRAWLER TRACTORS
WHEEL TRACTORS
DIESEL ENGINES
POWER UNITS

INTERNATIONAL HARVESTER

INTERNATIONAL INDUSTRIAL POWER

THIS DISASTROUS *Fire* COULD *have been* PREVENTED!

A buckled rail caused by the burning timbers below.

The LIBBEY-ZONE TREATMENT *would have saved this bridge!*

From main line to shunting trestle, every open-deck timber bridge presents its own fire hazard. Brake shoe sparks, lighted cigarettes tossed by careless smokers, drippings of molten metal from overheated shoes, oil, coal, and other fuel dropped from locomotive boxes . . . all these elements find a hungry target in unprotected surfaces where ordinary coatings have worn down and cracked to expose splintered wood.

Leading Railroads are now restricting fires with the LIBBEY-ZONE PROCESS* using Heavy-Duty Coating . . . the revolutionary scientific discovery that combines genuine Canadian ASBESTOS FIBRE with intensified elastic ASPHALT GUM to produce a LONG-LASTING, ECONOMICAL, GENUINELY FIRE-RETARDANT SURFACE for open-deck bridges and trestles.

"ZONE" HEAVY-DUTY COATING, when combined with the proper aggregate of crushed stone or gravel, expands with heat . . . yet does not melt; contracts with cold . . . yet does not flake! Laid thickly, the compound's resilient protective coating stretches over cracks and sinks into low spots, yet maintains an even spread and holds aggregate firmly in place when cold. "ZONE" HEAVY-DUTY COATING is easily and quickly applied and has nationwide distribution. Investigate the money-saving advantage of "ZONE" HEAVY-DUTY COATING.

Write for complete information to . . .

*Names of Railroads upon application

THE ZONE COMPANY

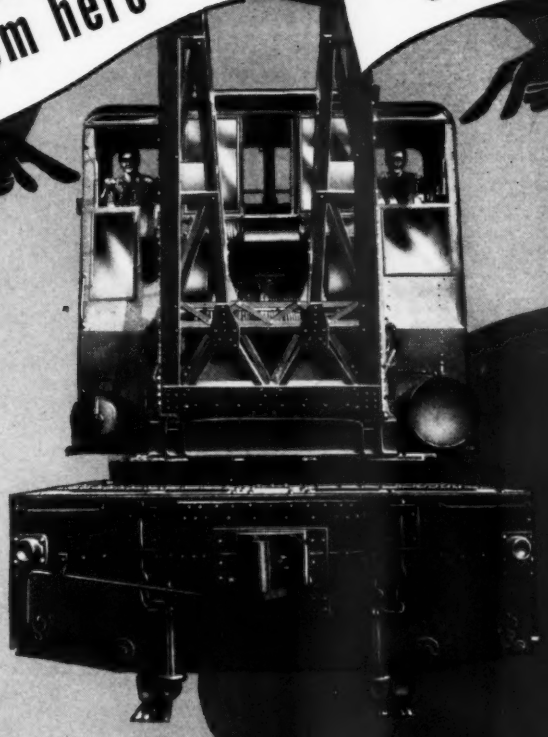
A Division of the Southwestern Petroleum Company, Fort Worth 1, Texas

Regional Representatives: John A. Roche, 80 E. Jackson Blvd., Chicago, Illinois and Clarence Gush, Railway Exchange Bldg., St. Louis, Mo.

new INDUSTRIAL BROWNHOIST DUAL CONTROL permits operator to work...

from here

or here



dual control for better visi... efficiency and greater safety in maintenanc... way

Never before has any crane afforded the "visibility-unlim... Dual Control Locomotive Crane. It is ingeniously built with ... extends the entire width of the crane. Inside the cab, on each ... interlocking controls . . . easily reached by the operator without ... This arrangement allows perfect vision on either side of the track ... or working. Get all the facts about how this new Industrial Brown... Locomotive Crane can save money, save time, increase safety . . . wr...

BROWNHOIST BUILDS BETTER ... NAMES

INDUSTRIAL BROWNHOIST CORPORATION, BAY CITY, MICHIGAN

SALES OFFICES: New York, Philadelphia, Cleveland, Chicago, ... Boston, Los Angeles, ...

Tracks down trouble...but stays out of it...with TIMKEN® bearings

FAIRMONT RAILWAY MOTORS INC. *assures trouble-free performance with Timken bearings on the main axle, drive axle and idler pulley of this Fairmont M19 Series F inspection car.*

THIS Fairmont M19 Series F inspection car can count on a trouble-free life with Timken® bearings on the main axle, drive axle and idler pulley. Timken bearings reduce maintenance costs, prevent breakdowns, virtually eliminate friction.

Timken tapered roller bearings are precision made and finished to incredible smoothness. Made of Timken fine alloy steel, the best steel ever developed for tapered roller bearings, they normally last the life of the car. Line contact between the rolls and races of Timken bearings gives extra load-carrying capacity. The advanced design of Timken bearings permits the use of tighter closures that keep lubricant in and dirt and water out. Lubrication is reduced to a minimum.

Due to their tapered construction, Timken bearings take both radial and thrust loads—separately or in combination. Wheels and shafts are kept in positive alignment. Wheel gauge is maintained.

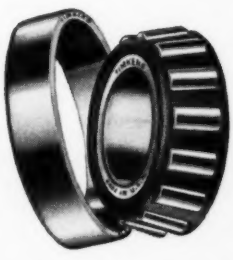
No other bearing can bring you *all* the advantages you get with Timken tapered roller bearings. Be sure they are included in all the equipment you build or buy. Look for the trade-mark "Timken" on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.

POSITIVE ROLLER ALIGNMENT
Wide area contact between roll ends and rib of the cone prevent Timken rollers from skewing. Result: bearings roll easier, last longer.

The Timken Company is the acknow edged leader in: 1. advanced design; 2. precision manufacture; 3. rigid quality control; 4. special analysis steels.

TIMKEN
TRADE-MARK REG. U.S. PAT. OFF.
TAPERED ROLLER BEARINGS



NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ▯ AND THRUST ▯ LOADS OR ANY COMBINATION ⊙

The MASTERPLATE "IRON-CLAD" CONCRETE FLOOR

"IRON-CLAD" means
4 to 6 Times Longer Floor Life
Plus

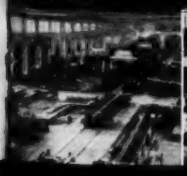
- WEAR RESISTANT
- SPARK RESISTANT
- STATIC DISSEMINATING
- NON-DUSTING
- CORROSION RESISTANT
- EASY-TO-CLEAN
- NON-SLIP SURFACE
- ECONOMICAL
- BUILT-IN-COLOR

Many Million Square Feet Of Masterplate Floors In Service.

Write For New 36 Page Illustrated Booklet Giving Full Information.

the MASTER BUILDERS Co.
CLEVELAND 1, OHIO — TORONTO, ONTARIO

WEAR RESISTANT



SPARK-SAFE

NON-DUSTING

CORROSION RESISTANT

EASY-TO-CLEAN

NON-SLIP SURFACE

MULTI-PURPOSE

NEW TYPE COATING

1. Prolongs rail life

2. Cuts railway maintenance costs

Rust-Chek

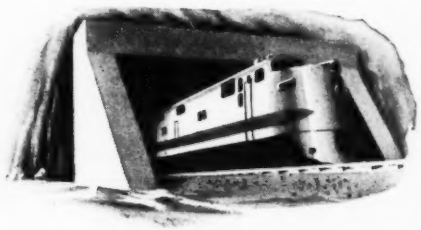
CORROSION-RESISTANT COATING

...resists water, salt and acid fumes

RUST-CHEK was originally developed by the Rinshed-Mason Company to prevent the notoriously excessive corrosion of railway track in tunnels. Applied to the web and base of rails, Rust-Chek prolongs rail life where the going is rough; is unaffected by the impact of train wheels and the consequent flexing of the rails.

Today, Rust-Chek is finding ever widening acceptance for numerous other railway applications, but especially where corrosion conditions are severe, for Rust-Chek possesses exceptional resistance to water, salt and acid fumes; retains, with long years of service, unusual qualities of flexibility and adhesion that definitely prevent cracking, chipping or peeling.

Investigate now! Skilled R-M engineers to assist you.

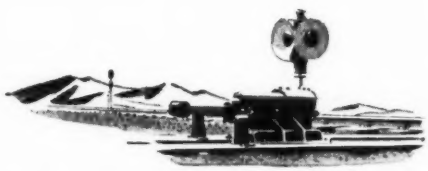


PREVENTS EXCESSIVE RAIL CORROSION

Salt, water and acid fumes often cause frequent and costly rail replacement. Rust-Chek prevents excessive corrosion, but especially in certain tunnels; on rails subjected to brine drippings from heavy refrigerator car traffic; on rails running close to salt water, at grade crossings, etc.

PROTECTS BRIDGES AND STRUCTURAL STEEL

Bridges, round-house structural steel, etc., can be quickly and easily coated with Rust-Chek, adding countless years of life and greatly lengthening time between coats. Rust-Chek puts up a solid front against salt spray, locomotive fumes and moisture.



PROLONGS LIFE OF COSTLY EQUIPMENT

Signalling equipment, water towers, steel boats, barges, buoys, docks, and numerous other types of railway-owned equipment, need Rust-Chek protection for greatly prolonged service life. Unusually tough and highly water resistant, Rust-Chek is easy to apply, calls for no special equipment and may be either brushed or sprayed.

Write for DESCRIPTIVE FOLDER

Free Descriptive Folder and specifications will be sent you on request. Test sample will also be forwarded if wanted. *Write now.*

RINSHED-MASON CO.

5935-71 MILFORD AVE. . . . DETROIT 10, MICH.

Clean Ballast *at Lowest Cost*

The Speno method results in a self-cribbing track—cleaning that lasts from one general track raise to the next. Long experience in the field, not theory,—equipment that has been steadily improved—means a thorough, lasting job and important maintenance economies in both track and rolling stock.

With the Speno method, stone ballast is twice screened. The two passes are completed in less time than a single pass under other methods. Even a single pass by the Speno method is more effective than a single pass under other methods for the reason that the Speno method provides the service uniformly where it is required. Speno equipment works under traffic and is the only large ballast cleaning machine that *does not foul trains on adjacent tracks* while in operation.

The speed and capacity of Speno performance can best be gauged by the 1949 record of one of our units. 725 single track miles were cleaned in 1435 hours of actual working time. With the two cuts made, this is equivalent to 1450 miles of ballast cleaning by other ballast cleaning methods.

We shall gladly work out a program with you.

FRANK SPENO RAILROAD
BALLAST CLEANING CO. INC.
628 West State Street — Ithaca, N. Y.

Painted with PITTSBURGH IRONHIDE

6 years ago—and still looks good!

Two views of the Frisco Railroad's bridge at Memphis, Tenn., soon after it had been painted with Pittsburgh IRONHIDE.

Pittsburgh's tough, durable Railway Finishes are designed to safeguard costly properties against rust and corrosion

NO BETTER example of the toughness and durability of Pittsburgh Railway Finishes can be offered than the paint on the Frisco Railroad's bridge over the Mississippi River at Memphis, Tenn.

This structure was completely repainted with Pittsburgh IRONHIDE in 1942. For six years this finish has withstood rust and corrosion, industrial gases, oil, soot and other destructive agents. In cold weather as in hot it has adhered firmly to the metal surfaces it covers. It is this kind of performance that makes IRONHIDE ideal for the protection of railway bridges, towers, tanks, catenaries and other metal structures.

Write today for our booklet which lists Pittsburgh Railway Structural Maintenance Finishes and offers many practical suggestions for their efficient and economical use.

• • •

PITTSBURGH PLATE GLASS COMPANY
Industrial Paint Division, Pittsburgh, Pa.
Factories: Milwaukee, Wis.; Newark, N. J.; Springdale, Pa.; Houston, Texas; Los Angeles, Calif.; Portland, Ore. Ditzler Color Division, Detroit, Mich. The Thresher Paint & Varnish Co., Dayton, Ohio. Forbes Finishes Div., Cleveland, Ohio.

PITTSBURGH PAINTS

PAINTS • GLASS • CHEMICALS • BRUSHES • PLASTICS

PITTSBURGH PLATE GLASS COMPANY

"X" MARKS THE SPOT for MECHANIZATION with NORDBERG MACHINES

EACH "X" marks a spot where specific rail laying and reballasting jobs can be handled faster, more efficiently, with Nordberg Track Maintenance Machines. Starting with the removal of old spikes . . . right on through final operations in laying of new rail and ballast reconditioning . . . each Nordberg Machine is designed to handle its job with speed and accuracy.

Mechanization with Nordberg Machines is the answer to costly, time-consuming maintenance operations. It will pay you to investigate how you can accomplish more with the time and labor saving advantages of Nordberg Machinery.

Write for descriptive bulletins on any or all of the equipment shown here.

SPIKE PULLERS . . . Fast spike pulling by machine speeds up re-laying and reduces the cost of the entire operation.

POWER TRACK WRENCHES . . . All bolts in old rail quickly removed with power wrench.

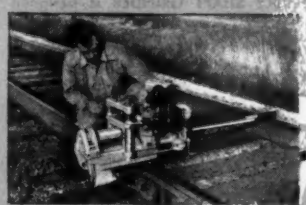
ADZING MACHINES . . . provide tie seats in keeping with today's maintenance standards —all level and in same plane.

NORDBERG GAGING TEAM . . . consists of one man operating TRAKGAGER, one man on the SPIKE HAMMER and two men with SPIKE HOLDERS doing the gage spiking.

CRIBEX . . . removes material contained in the cribs and deposits it beyond the ends of the ties.

SPIKE HAMMERS . . . At this point Nordberg Spike Hammers take over for fast, accurate driving of new spikes.

BALLASTEX . . . excavates the ballast in area between tracks or in shoulder. Disposes of it by wasting or by feeding to SCREENEX for cleaning.



RAIL DRILLS . . . for high-speed drilling of bolt holes in closure cuts. Light weight, easily handled by one man.

SCREENEX . . . takes excavated fouled ballast fed by BALLASTEX, cleans material and returns it to track, intertrack, or shoulder.

Look to **NORDBERG**

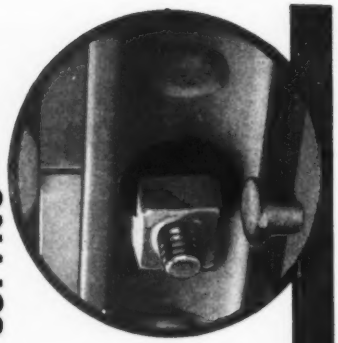
NORDBERG MFG. CO., Milwaukee 7, Wisconsin

. . . for continually improved TRACK MAINTENANCE MACHINERY

to do a Better, Faster Maintenance Job at Lower Cost

BEALL Hi-Duty SPRING WASHERS

made especially for Railroad Service



BEALL Hi-Duty SPRING WASHERS are made especially to stand the strain of the heavy-duty rail service required by today's high-speed freight and passenger trains.

We control every step of their manufacture — from the specification of the specially-developed formula and process used in making the steel to the forming, hardening, tempering and testing operations.

Their dependability has been proven by years of actual service on hundreds of railroads.

BEALL HI-DUTY SPRING WASHERS, being made especially for railroad service are strong and tough, yet provide the necessary "springing action" required at rail joints, frogs and crossings.

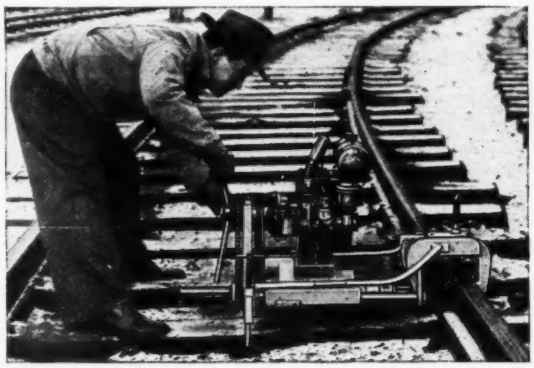
BEALL TOOL DIVISION (HUBBARD & CO.)
140 Shamrock St., EAST ALTON, ILL.
SPECIALIST MANUFACTURERS OF SPRING WASHERS

SERVICE MORE TRACK IN LESS TIME FOR LESS MONEY - -

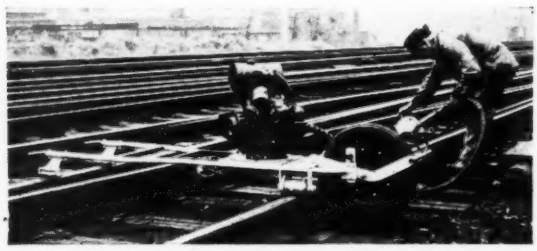
WITH SPEEDY, EASY-OPERATING RTW DRILLS AND GRINDERS

Six days' work in five! You'll have to put track in condition fast to meet new work schedules—and you can! Low-cost, low-manpower RTW Drills and Grinders speed up your maintenance work . . . enable you to keep rails ship-shape without crowding your track gangs . . . and save you money to boot!

Two popular RTW maintenance machines are shown below—others available also give you labor-saving advantages at substantial savings.



RTW'S MODEL P-43 POWER TRACK DRILL gives you 60-second drilling . . . quick, accurate drill-leveling . . . easy-acting, easily-controlled screw feed . . . easy-handling (aluminum castings keep weight down to 125-lbs.) . . . quick on/and/off-rail action . . . chuck jaws that take beaded bits up to 1½" and automatically stay open when chuck is loosened.



RTW'S MODEL P-44 PORTABLE FLEXIBLE SHAFT GRINDER is designed to give you added savings in labor and costs when you lay new track or repair old.

Grinder's 360° swivel engine mount prevents short bends and kinking of flexible shaft . . . clutch assembly in the engine protects shaft from overload . . . three position wheel clears switches and crossovers easily . . . light and compact, it gets on and off the track fast . . . quickly adaptable for auxiliary equipment: Straight Wheel Hand Piece, Angle Hand Piece for Cup Wheel, Cross Grinder Guide and Track Drill.

Write today for further information on the P-44 Portable Flexible Shaft Grinder, the P-43 Power Track Drill, and other easy-to-operate RTW equipment.

Railway Track-work Co.
3207 KENSINGTON AVE., PHILADELHIA 34, PA.

Distributors for

Burro Cranes
Dapco Sprayers
LeRoi Air Compressors
McCulloch Chain Saws
THOR Electric Tools
Wayer Impactors

Moss crossings are pressure-creosoted black gum, and they're tough as they come. They will take the hardest kind of pounding from vehicular traffic, and still stand up in good shape with a minimum of maintenance. There is a very good reason for this, and the reason is the black gum from which they are manufactured. Black gum is a hardwood timber growing in the swamps of our southern states, and is well known for its resistance to shock and abrasion. Its the interlocking grain characteristic of this species which gives you that "extra" in resistance to wear and which results in a tough, long lasting crossing that becomes smoother as the years go by.

When roadbeds go to pieces time and again, it's usually a sign of buried rain in the subgrade, even though the surface may be dry. The only sure cure for continuing maintenance trouble is to drain out the excess water and keep it out. You can do this easily and economically with Armco Perforated Pipe.

Through scientifically placed holes, Armco Pipe absorbs unwanted water and drains it away. Subgrades become dry to provide a firm foundation. Frequent maintenance disappears.

Armco Pipe is ideal for complete drainage systems or for correcting trouble spots. It is easy and economical to install. Unskilled workmen quickly join long lengths of Armco Pipe into a uniformly strong conduit by using simple band couplers. There are fewer sections to lay, fewer joints to assemble.

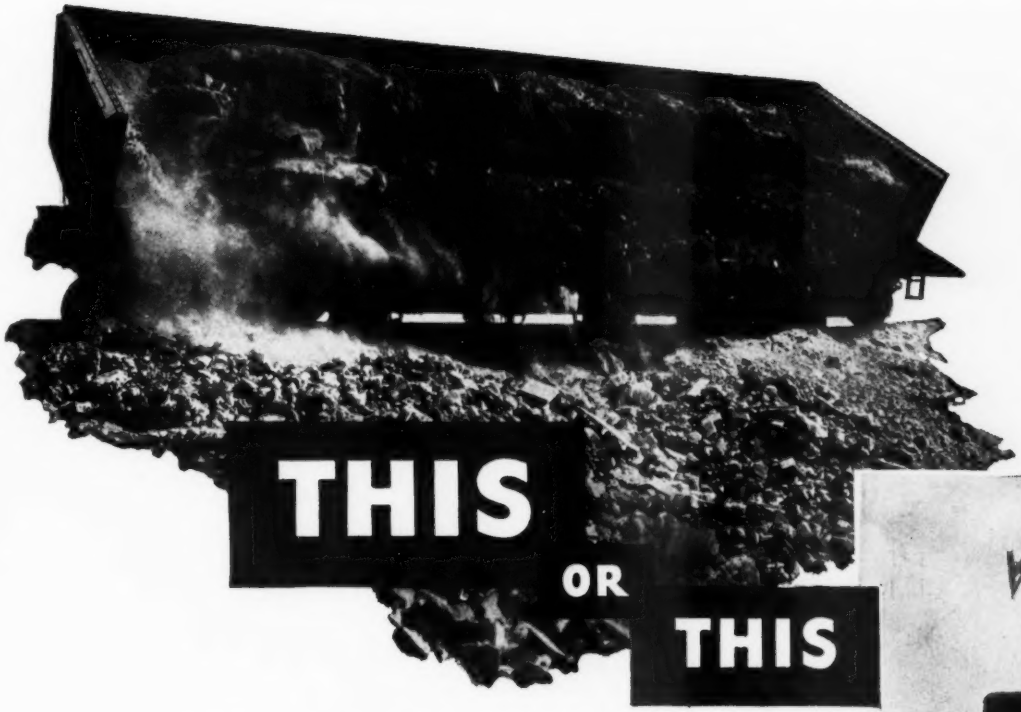
You are assured long, efficient service from Armco Pipe. Though light in weight for easy handling, it has strength to withstand crushing, cracking or disjointing under the impact and vibration of heavy loads. It is not affected by shifting soils or severe frost action.

Let Armco Perforated Pipe help you correct unstable track conditions. You'll like the economy and freedom from maintenance. Write for complete information. Armco Drainage & Metal Products, Inc., 3540 Curtis Street, Middletown, Ohio. Subsidiary of Armco Steel Corporation.

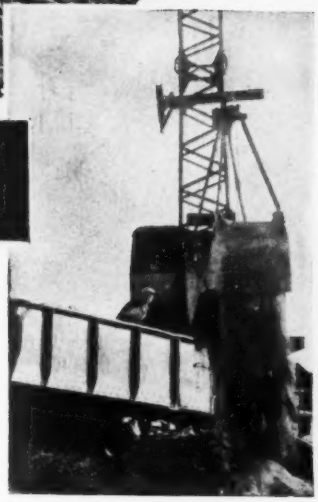
Export: The Armco International Corporation

ARMCO PERFORATED PIPE

ARMCO



THIS OR THIS



The Difference is $2600 a year per car!

That's a lot of difference.

Especially when you consider that it represents net savings from just *one* car in *one* type of maintenance-of-way service.

Look at it this way–

It takes time and skilled labor to unload worn-out, obsolete air dump cars or to unload gondolas with a crane. But it takes *less than a minute* for anyone to dump a fully loaded Magor Automatic Air Dump Car.

Figure that your work train costs about $200 a day. That includes time, labor and equipment. By replacing gondolas or old air dump cars with New Magor Automatic Air Dump Cars, you save at least an hour a day. That's your $2600 a year savings.

But you'll use your new Magor Air Dump Car for more than just one type of service. Probably everything from ditching to snow removal. And in every operation you are cutting time and labor costs.

Cutting work train costs is just one part of the story. Years of research, experience, field tests and top engineering skill are incorporated into the new Magor Automatic Air Dump Car. They'll operate efficiently and dependably under all conditions.

For additional information about the New Magor Automatic Air Dump Car, write for Bulletin DR-112.

MAGOR

New Magor Cars cost less than $1.25 a day to own.

CAR CORPORATION, 50 CHURCH STREET, NEW YORK 7, N. Y.

World's Largest Producer of Air Dump Cars

THE LAST WORD ON PAINT

Send for your free copy today!

If you've been buying paint without the information this new Alcoa book contains; if you've never used the superlative aluminum paints it describes—your paint knowledge is out of date. New pigment and vehicle developments have revolutionized aluminum paint performance. This valuable book tells how to get the best paint and apply it for longer service. Includes coverage tables, photographs of results, facts on correct types of ready-mixed aluminum paints for metal, masonry or wood surfaces, inside or out—and for heated surfaces.

Alcoa does not make paint—only aluminum pigment. But we've prepared this book to help you select the right aluminum paint for any job—and apply it properly. Send the coupon now. Your free copy will come to you by return mail.

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Paint Service Bureau, 1820C Gulf Building
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(Please Print)

Company _____ Position _____

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City _____ State _____

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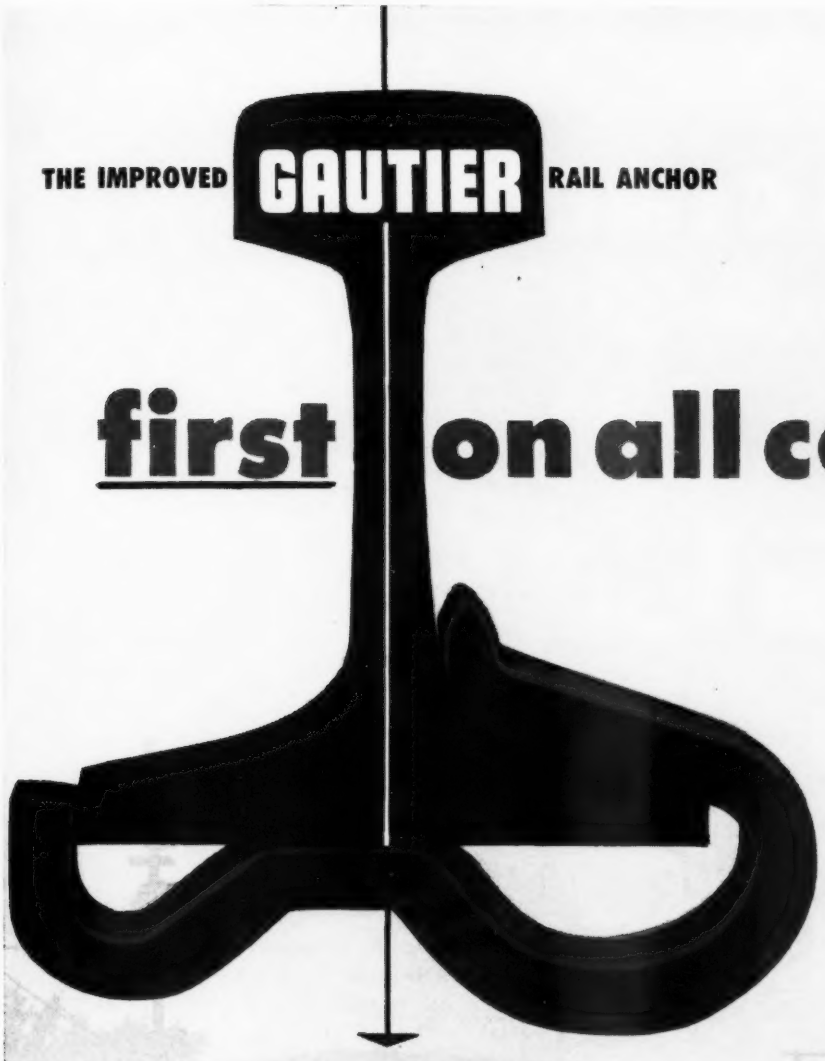
ELECTRICAL CONDUCTORS • SCREW MACHINE PRODUCTS • FABRICATED PRODUCTS • FASTENERS • FOIL • ALUMINUM PIGMENTS • MAGNESIUM PRODUCTS

THE IMPROVED **GAUTIER** RAIL ANCHOR

first on all counts



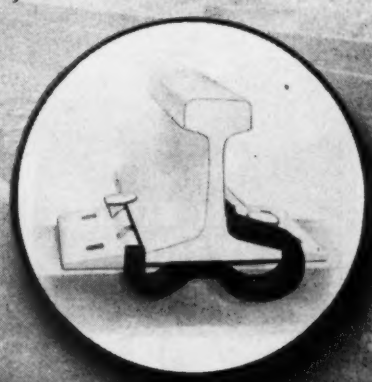
Saves Labor
A one-piece anchor that can be applied quickly with a maul or spike maul . . . no time lost.

Can't Be Overdriven
So constructed that the loop end bears against the fillet which joins the web to the base of the rail . . . prevents overdriving.

Low Maintenance Cost
Alloy spring steel plus scientific design assure long, trouble-free service under any track conditions.

For New or Old Rail
Substantial take-up and four-point rail contact makes the Gautier the most suitable rail anchor for re-application on old rail. It's the outstanding rail anchor on the market today.

THE Improved Gautier has passed the exacting test of railroad track and maintenance men. It has been tried, and proven *first*, on four important counts . . .

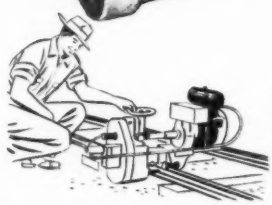


MID-WEST FORGING & MANUFACTURING CO.
General Offices: 38 SOUTH DEARBORN STREET, CHICAGO 3, ILLINOIS
Manufacturing Plant: Chicago Heights, Illinois
Eastern Representative: Moore & Steele Corp., Owego, Tioga County, N. Y.

YOUR **EXTRA EMPLOYEE** THAT WORKS WITHOUT PAY

RACINE *Portable* RAIL DRILL

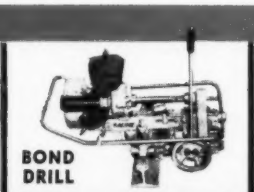
- LIGHT IN WEIGHT -- 165 lbs.
- EASY TO HANDLE
- POWERFUL -- FAST
- FITS ALL RAILS
- AUTOMATIC POWER FEED



See this modern, gas-engine powered rail drill. A machine built to machine tool precision standards. It is a rugged, accurate drill press on horizontal lines.

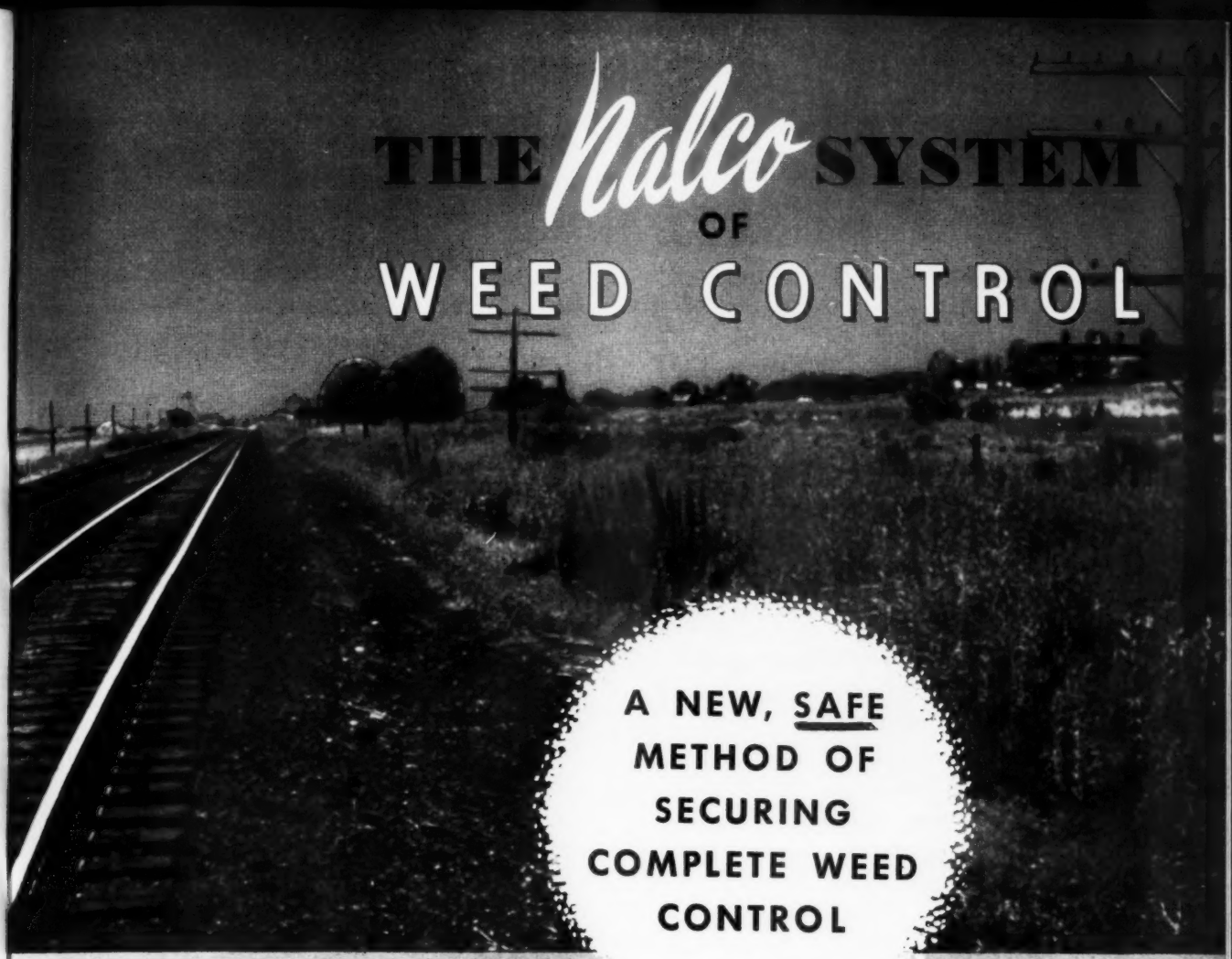
Light in weight, mounted on rollers, without outboard supports, this machine can be handled and operated by one man. Husky, quick-acting clamps hold the machine securely on the rail and provide quick removal to clear traffic. Finished holes can be produced in one to two minutes depending on drill size and web thickness. Handles all size drills. Special type *automatic power feed* insures a predetermined drilling time per hole. Definite output per man-hour can be established. Write today for Free 3-color catalog.

OTHER PORTABLE MACHINES BY RACINE



RACINE TOOL AND MACHINE COMPANY
1738 State Street — Racine, Wis.

STANDARD FOR QUALITY AND PRECISION · RACINE · RACINE TOOL and MACHINE CO.



- Nalco H-170 combines "contact" or top-killing action with translocation or root-killing action.
- Extremely rapid penetration and translocation in the plant.
- Extensive root kill retards regrowth.
- Low volatility eliminates fire hazard.
- Non-conductor—will not disrupt track signal circuits.
- Safe to use where livestock may be grazing.
- Completely insoluble in water—will not contaminate water supplies. Rainfall after application does not reduce effectiveness.
- No mixing required.

NALCO H-170 Weed Killer is a product of nearly five years of laboratory research, tests and field trials on railroad right-of-way. Its combined properties assure a complete top kill of all succulent vegetation, plus extensive root kill on many of the hardiest weed species. H-170 can be applied with any type of sprayer, and is used directly from the drums without mixing or dilution.

Maintenance men are enthusiastic about H-170, not only because of the thorough weed killing, but also because it does not imperil livestock and creates no fire hazard—either in storage or when being applied.

Average right-of-way dosage of Nalco H-170 is one gallon per 1,500 square feet. Where weed growth is high, slightly greater dosage is recommended. H-170 has effectively killed growths up to 30 inches high.

Full information on H-170 is available from your Nalco Representative, or direct from Nalco.

NATIONAL ALUMINATE CORPORATION

6196 West 66th Place • Chicago 38, Illinois

Canadian inquiries should be addressed to Alchem, Limited Burlington, Ontario, Canada

THE nalco SYSTEM • Serving Railroads through Practical Applied Science

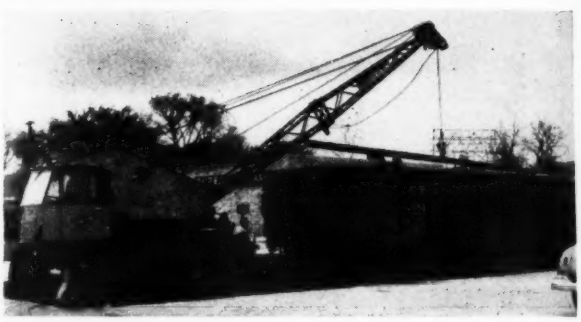
4 RAILROADS PROBLEMS SAVINGS WITH LORAINS

To lift . . . or dig . . . or load . . . or build . . . there's a money-saving, cost-cutting Lorain to do the job. Here are four examples of Lorains working on the railroad. Each job is a different one — and each job called for a different *type* of Lorain for best results. There's no limit to the applications for Lorains on your road . . . whether it be yard duty, right-of-way maintenance, new construction . . . any of these duties can be handled by one of 160 Lorain combinations in the complete line. Lorains are available in several capacities . . . for mounting on crawler or rubber-tires . . . with 5 interchangeable front ends. Your Thew-Lorain Distributor has a real story about Lorains for railroad duty that you can't afford to miss! See him soon — or send for new booklet "LORAINS ON THE RAILROADS."

MORE FOR YOUR MONEY IN A LORAIN

THE THEW SHOVEL CO.
LORAIN, OHIO

BIG LORAINS FOR CONSTRUCTION A big 2-yard Lorain-820 shovel loads ballast from bank cut into gondolas for the Frisco road.



MOBILE LORAINS FOR YARD DUTY A 30 m.p.h. mobile Lorain Moto-Crane on rubber tires covers a lot of ground per day for a midwestern railroad.

MAINTENANCE OFF THE RIGHT-OF-WAY Off-track maintenance called for off-the-car service and was solved by this Lorain TL dragline, cleaning ditches for a central Illinois railroad.

MAINTENANCE ON THE RIGHT-OF-WAY Working from atop the flat car, this Lorain-41 clamshell moved along the track on maintenance work — reaching far to either side of the right-of-way.

THEW LORAIN®

SHOVELS • CRANES • HOES
DRAGLINES • CLAMSHELLS
ON CRAWLERS OR RUBBER TIRES

ADDITIONAL INFORMATION

On Any of the Products Mentioned in This Issue

Below is a complete index of the products referred to in both the editorial and advertising pages of this issue. If you desire additional information on any of them, use one of the accompanying addressed and stamped postcards in requesting it. In each case give name of product and page number. The information will come to you directly from the manufacturer involved, without any obligation on your part.

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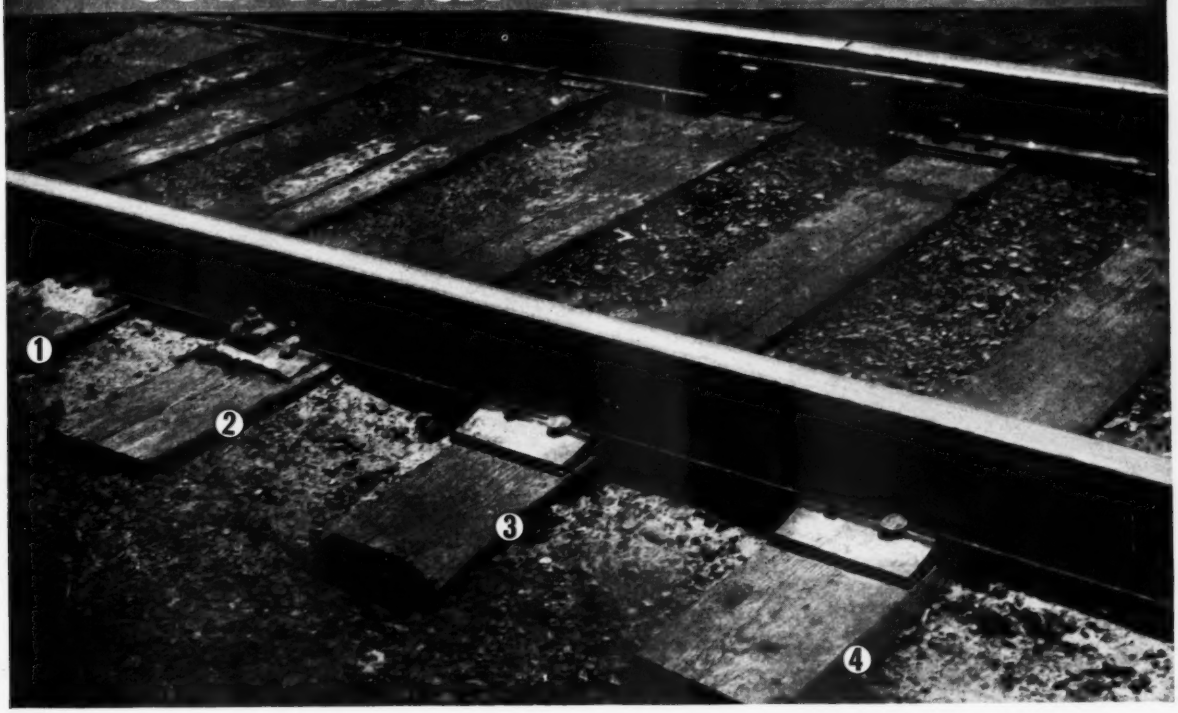

These ties clearly illustrate the advantages of using FABCO Tie Pads. Ties number 1, 2, 3 and 4 were installed at the same time in a busy railroad terminal on a 14 degree curve. This section of track has as high as 200 train movements a day, with a great deal of starting and stopping and heavy use of sand. Ties number 3 and 4 were protected with FABCO Tie Pads, whereas Ties number 1 and 2 were not. Note that the plates on ties number 1 and 2 have buried themselves below the level of the tie surface, whereas ties number 3 and 4 show no damage from plate cutting.

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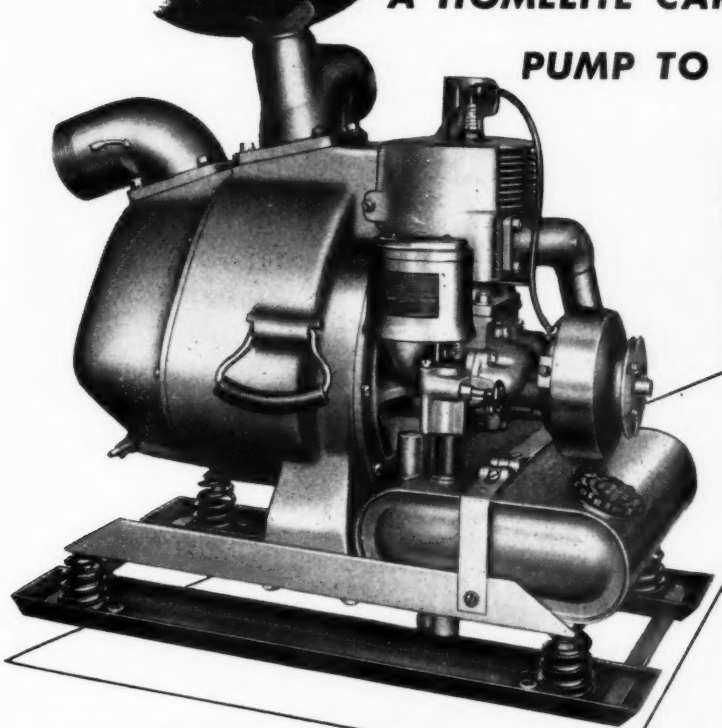

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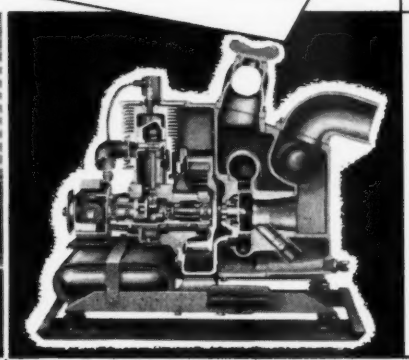

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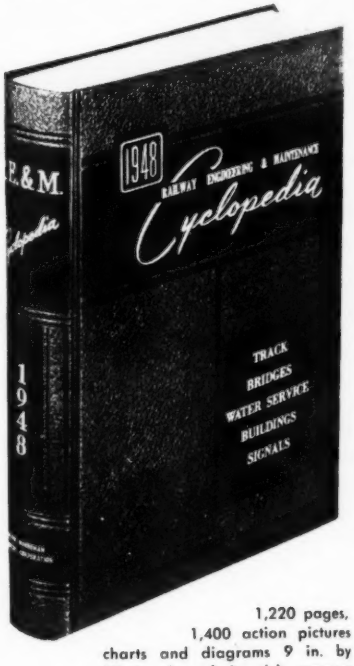

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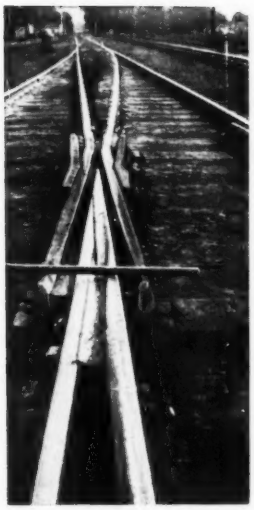
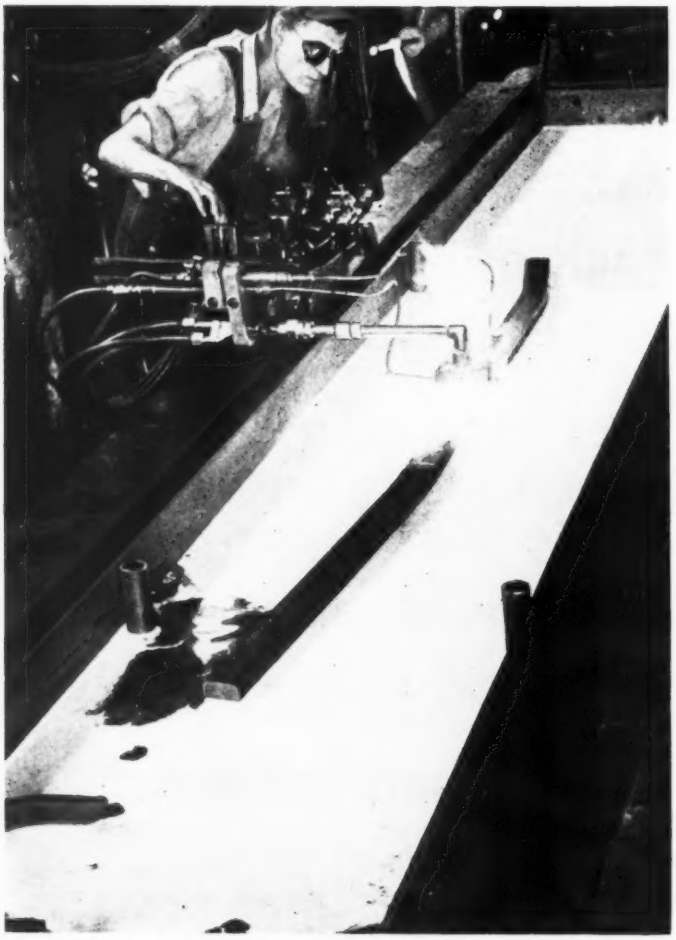
proves flame hardening of frogs cuts frog replacement and maintenance costs of rolling stock



Here you see the wear behind the heat treated area, and get some idea of the traffic over the frog.



Setup showing the flame hardening operation with special quenching bath.

Several years ago, open-hearth carbon steel frog service life in certain locations on one of America's leading railroads averaged six months — replacement costs ran high.

In August 1947, Airco's modern flame hardening method was introduced, and flame hardened frogs were installed on switching leads — points where they would receive the greatest abuse.

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For further details about this process, write your nearest Airco office.

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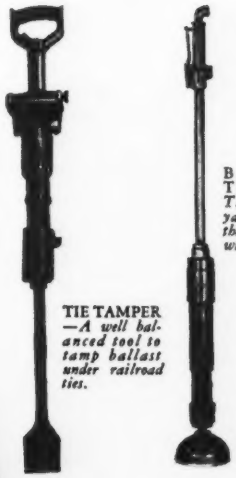

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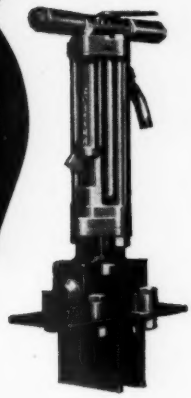
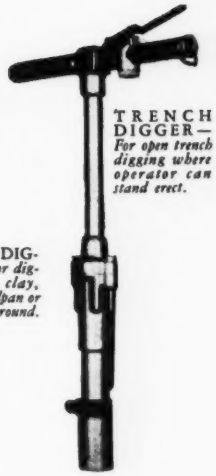


CLAY DIGGER—*For digging in clay, shale, hardpan or frozen ground.*



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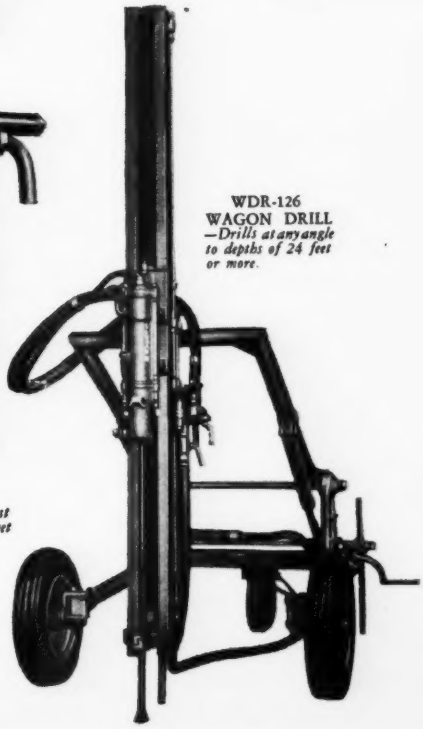
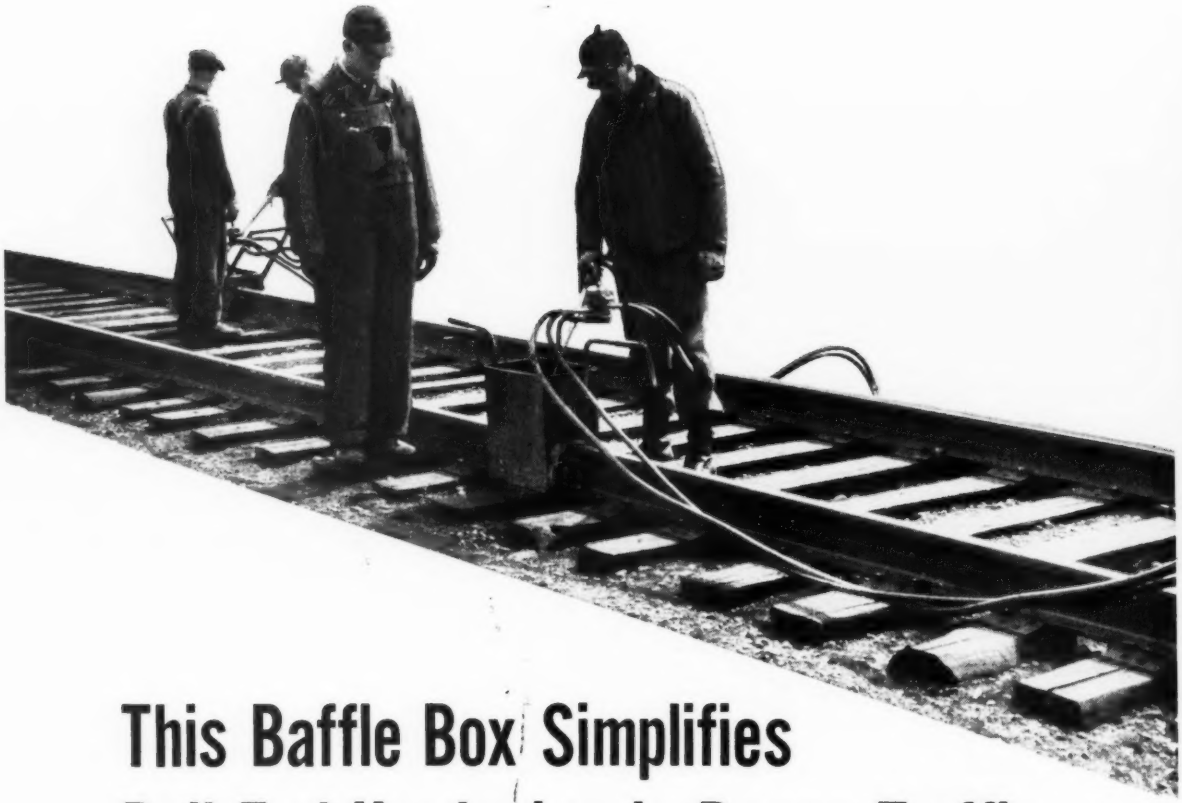


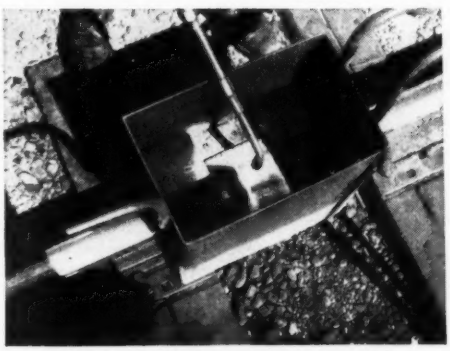
WDR-126 WAGON DRILL—*Drills at any angle to depths of 24 feet or more.*



This Baffle Box Simplifies Rail End-Hardening in Dense Traffic

Frequent removal and replacement of machine flame-hardening equipment in dense traffic reduces production. That's why OXWELD developed these light, easy-to-remove baffle boxes. They make rail end-hardening an easy job anywhere – in dense traffic or on new rail laid in open track.

Because they're inexpensive and simple to build, many baffle boxes can be made available to divisions or sub-divisions. Roadmasters can then have any end-hardening job done without delay, and fast, too. Using one baffle box, a crew can flame-harden about 400 joints a day —an oxy-acetylene flame quickly produces the desired hardness on the rail end surfaces. Ask OXWELD to tell you more about these efficient and easy-to-build baffle boxes.



With the baffle box in place, both rails at one joint are hardened simultaneously.

THE OXWELD RAILROAD SERVICE COMPANY
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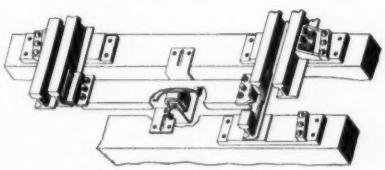
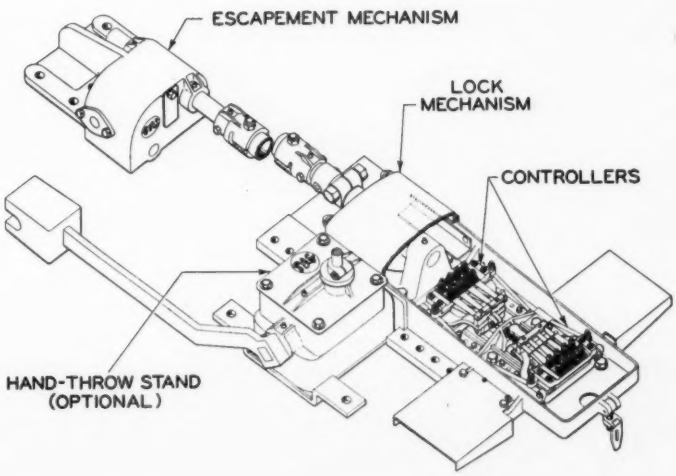
- they automatically unlock the points for trailing moves, or for hand operation of the switch.



G-R-S roller bearings help your spring switches roll instead of drag on the riser plates. Write for Folder 122.



For further information write your G-R-S district office. Ask for Handbook 21 and Bulletin 179.

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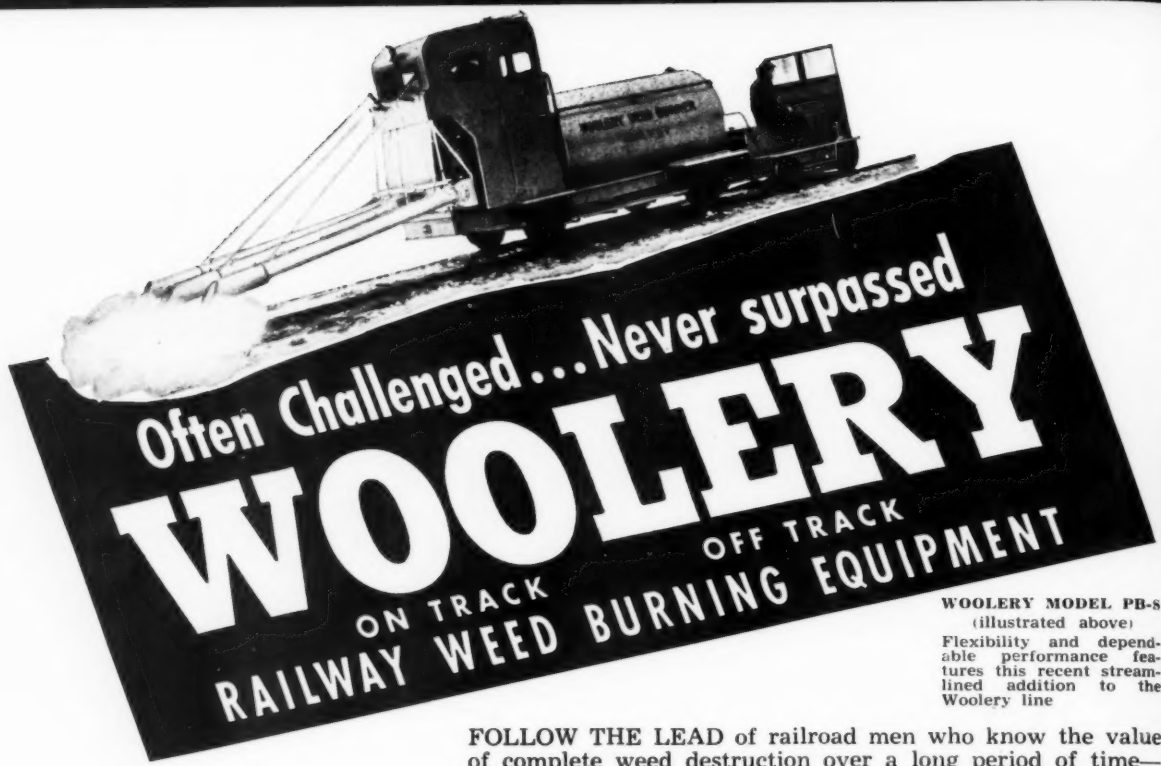

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ON TRACK OFF TRACK

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(illustrated above)
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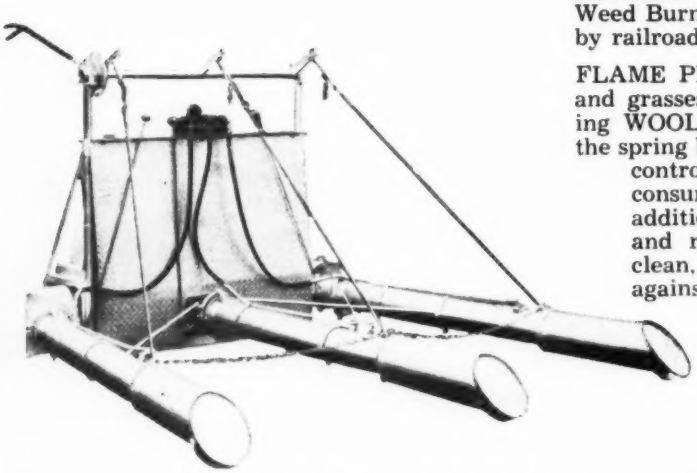
FLAME PLAYS NO FAVORITES—it destroys ALL weeds and grasses efficiently and economically. Low-cost oil burning WOOLERY Weed Burners check weeds and grasses in the spring before they get a head start and provide continuous control of vegetation throughout the entire year. They consume leaves or rubbish that clogs drain ditches. In addition to a more sightly right-of-way, burning weeds and rubbish also permits better drainage assuring a clean, hard, dry roadbed and maximum protection against washouts or roadbed erosion.

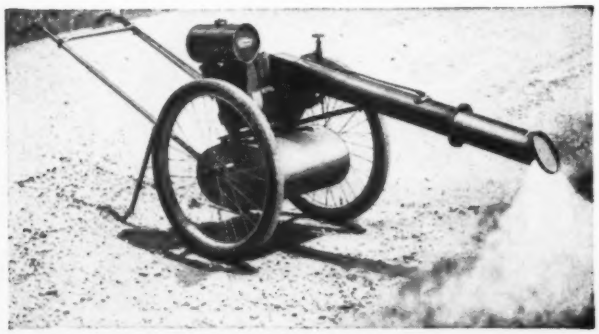
YOU CAN DEPEND ON WOOLERY Weed Burning Equipment for unsurpassed economy and efficient operation.



OFF TRACK MODELS

above—**WOOLERY MODEL PB**—A 3-burner unit providing great operating flexibility. It can be mounted on a push car for on-track burning, or mounted on a 1½ ton truck or trailer for off-track burning. Requires only two men to operate. In summer a versatile weed-burner every railroad can use; in winter, an ideal switch thawing unit.

below—**WOOLERY MODEL AJX**—is a small, compact off-track unit designed for use around stations, buildings, highway crossing, switch stands, etc. Also ideal for thawing snow and ice from drainage pipes and Hopper-bottom cars.

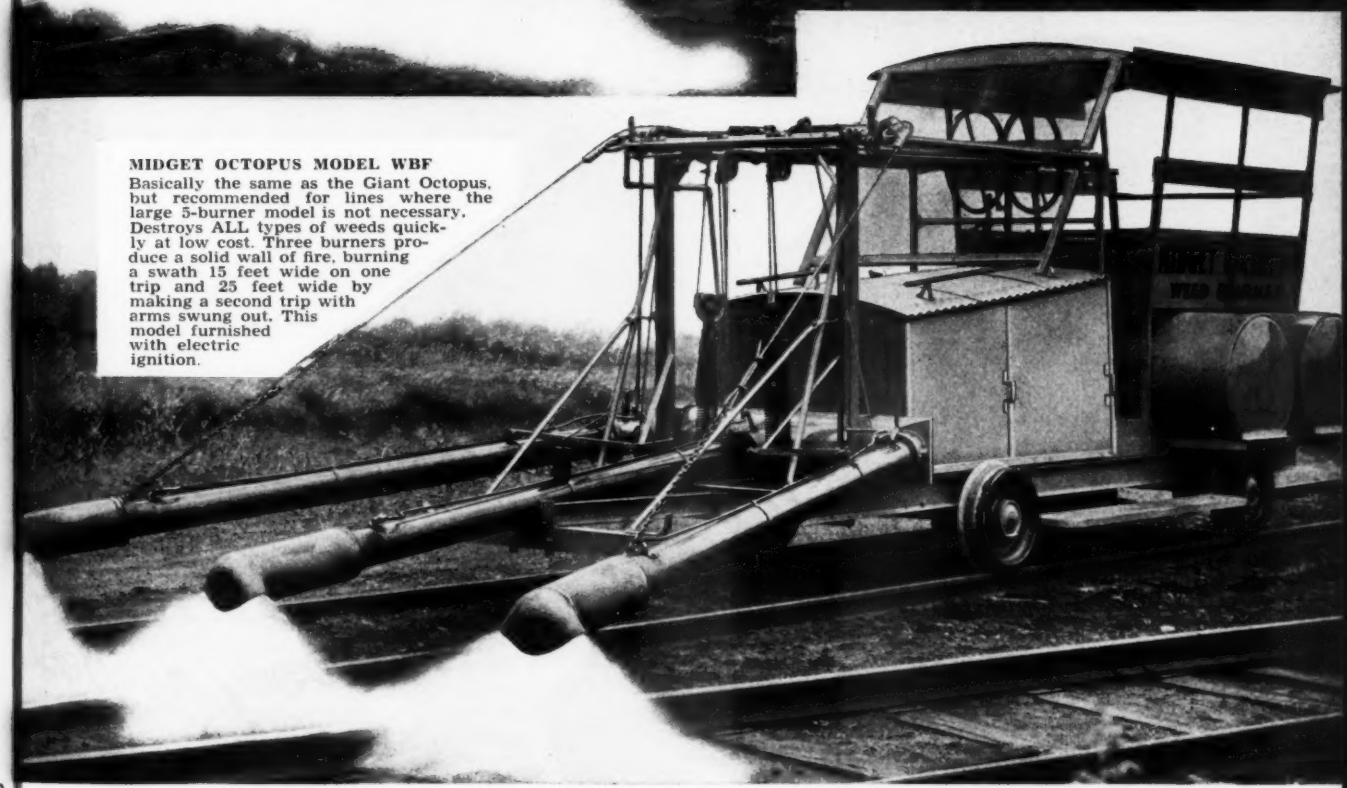


WOOLERY MODEL PB-B

This Trailer Car Unit with two-man crew burns a 15 foot swath on one trip or a 25 foot swath with arms swung out by making a second trip. Equipped with 8 foot individually controlled burner tubes which may be raised or lowered to meet ground contour. Electric ignition optional. Can be taken off at crossings by two men.

THE GIANT OCTOPUS WBZ

The five burner heads of this model spread a solid wall of intense flame 25 feet wide. Burns up to 35 feet wide by making a second trip with arms swung out; long life Woolery Firesist Alloy Burner Heads with electric ignition; 1400 gallon fuel oil tank; 4-speeds in eitner direction, with 4-wheel drive; vacuum braking for all wheels. All controls conveniently located on operator's seat.



MIDGET OCTOPUS MODEL WBF

Basically the same as the Giant Octopus, but recommended for lines where the large 5-burner model is not necessary. Destroys ALL types of weeds quickly at low cost. Three burners produce a solid wall of fire, burning a swath 15 feet wide on one trip and 25 feet wide by making a second trip with arms swung out. This model furnished with electric ignition.

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WOOLERY MACHINE COMPANY

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ENGINEERED ON THE JOB As you would expect of rugged cost-cutting machines like these, they have been engineered on the job, under all types of grueling operating conditions. They have been designed, and redesigned, over a period of years for one purpose: to do the best job possible, dependably, at the lowest operating cost.

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BEFORE

DURING

AFTER Before-During-After photos showing a typical road-bed profiling job by a Jordan Spreader-Ditcher. Note use of bank sloper wing and ditch section on main wing resulting in clean lines of ballast, berm, ditch and bank at a uniform distance from centerline of track.

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WALTER J. RILEY, *President*

EAST CHICAGO, INDIANA

No. 255 of a series

Railway Engineering and Maintenance

SIMMONS-BOARDMAN PUBLISHING CORPORATION

79 W. MONROE STREET
CHICAGO 3, ILL.

Subject: My Deepest Gratitude

March 1, 1950

Dear Readers:

This will be my last letter to you as editor of Railway Engineering and Maintenance, for on April 1 I take up new responsibilities, and you will have a new editor.

In the past I have written to you on this page about many things, shared with you our problems, spoken of your achievements, and told you of our plans, efforts and aspirations to make this publication of greatest interest and value to you. This letter—my last—from a heart full of gratitude, must express, as best I can, the depth of my appreciation for your understanding of our problems, and for the friendliness, encouragement and helpfulness you have extended to us so freely over the years. These have brought joy to our task, and a measure of success that could not otherwise have been attained.

April 1 rounds out for me, but for a few months, 25 years of association with Railway Engineering and Maintenance. In all these years, the railroads and the interests of railway engineering and maintenance men have been my work, my life—my delight. In my travels—and yours—I have met hundreds of you; many on frequent occasions. To call at your offices, or to meet you in the field, was always to receive a cordial welcome and the fullest cooperation. Under your direction and escort, I have seen railway engineering and maintenance practices in action as few others have been privileged to see them in an equal number of years.

When time and circumstances have prevented securing or absorbing all of the necessary information in the field, you have generously laid it down on my desk, time and again, that we might pass it on to others through our pages. On many other occasions you have answered letters of inquiry and questionnaires. You have submitted hundreds of answers to our "What's the Answer" columns, and you have graciously and willingly written many feature articles at our request, where we were unable, or inadequate in ourselves, to do the job.

How can an editor adequately thank his readers for such cooperation year after year, or repay such a debt of gratitude? I realize full well that most of this cooperation has been entirely impersonal, in the interest of your fellow railroad officers and your industry. At the same time it has been impossible for me not to detect in your friendly interest and support a gesture of regard and esteem for our publication and its editors, and that, need I say, has been a source of great satisfaction and inspiration.

In these various ways you have rendered a great service over the years to the railroads, to our publication, to our editorial staff, and to me personally for which I express again my deepest appreciation. That I sever our relationship as editor and reader is not done lightly, nor without hope of serving you in another way. But with much satisfaction I turn over my desk to a worthy successor, with full confidence that Railway Engineering and Maintenance can become a still more helpful and interesting publication in your midst if it can continue to claim, as I am sure it can, the encouragement and support you have always given to it in the past.

Sincerely,

Neal D. Howard
Editor

NDH:ag

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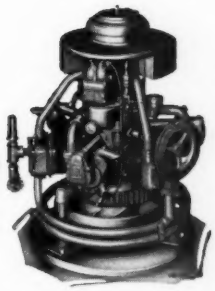

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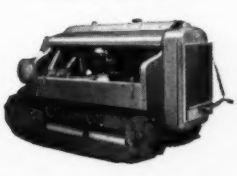

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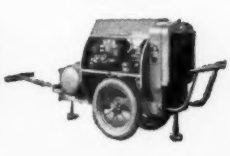

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Railway Engineering and Maintenance

NAME REGISTERED U. S. PATENT OFFICE

VOL. 46, NO. 3 MARCH, 1950

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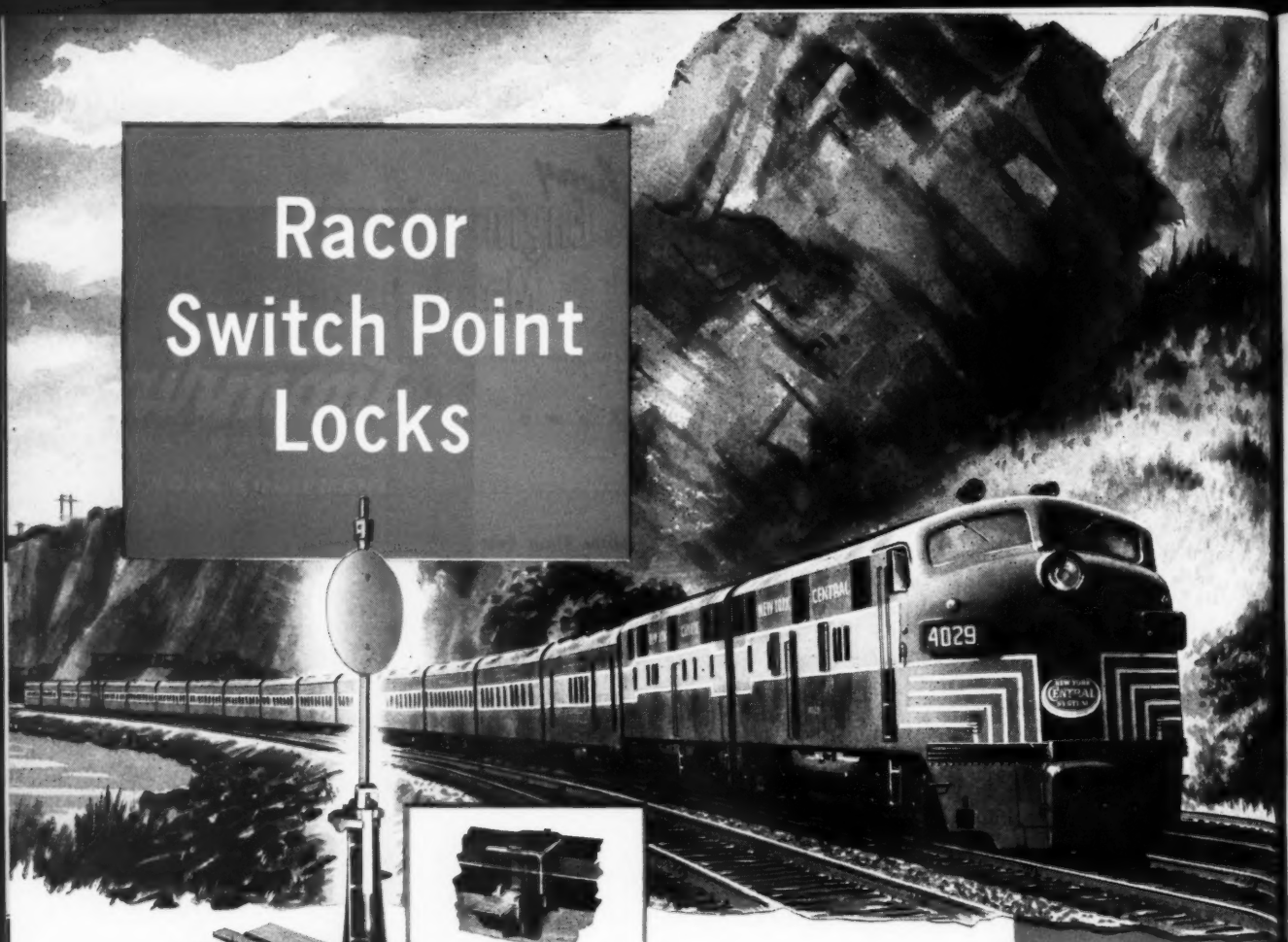

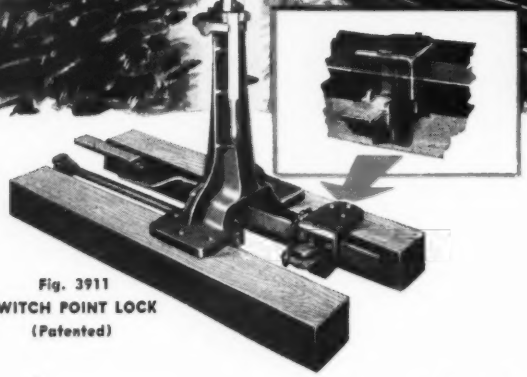

Fig. 3911
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Fig. 3911 (illustrated) for use with all types of column throw stands.
Fig. 3912 available for use with all types of ground throw stands.

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RACOR

Work Equipment —

As the Editor Sees It After 25 Years of Observation

Urged by members of our editorial staff (as I am about to bring to a close a quarter-century career as an editor) to write a few highlight observations of the development and use of power tools and machines by the maintenance forces of the railroads during the last 25 years, I do so with a feeling of some inadequacy, and hence, reluctance. And yet, with no development in railway engineering and maintenance practices more stimulating to me over the last quarter century as the result of on-the-job contacts with hundreds of machines, and association to the point of intimacy with many of those who have fostered the development and use of machines by the maintenance forces, I write these comments with a sense of some satisfaction.

There has, indeed, been marked development in power tools and machines for use by the roadway and structures forces during the last 25 years, and marked development in the use of these tools and machines by these forces during this period. To be sure, there were some machines in maintenance work prior to 1925, but it was not until the gasoline engine began to find general adaptation to all kinds of machines in the early Twenties that the big development in power tools and machines for maintenance-of-way and structures work really began.

Associated with a publication dedicated to following these developments—indeed to fostering them—and given an opportunity to see much, and to report a great deal, I have been in a particularly advantageous position to watch all of the steps in this development—step by step. Some of the steps have been virtually strides, some have been hesitant or faltering, but they have been consistently forward.

Within this period, on roads from the Atlantic to the Pacific, and from the Mexican border up into Canada, I have seen maintenance-of-way equipment at its best and at its worst. I have seen home-made contraptions containing only the germ of an idea, and makeshift units literally tied together with baling wire. I have viewed with amazement equipment which evidenced little or no understanding on the part of the designer or builder of the severe working conditions to be encountered in the field. I have heard many exaggerated claims of inventors and builders. I have seen equipment poorly programmed, inadequately operated, and both underworked and overworked. And I have marveled at the practice so prevalent on the railroads of supplying anything but the best in gasoline and lubricating oils for machines, while managements have wondered why performance was less than desired and repair bills high.

In this same period, with some amusement and surprise, I have seen maintenance officers with a minimum of work equipment out-talk their progressive, well-equipped contemporaries on the details and economies of machine operations, and have heard executive officers take credit for forward steps in mechanization on their roads, which, while they may have been forward, were only a faint echo of the progress already made on other roads. Too, I have hobnobbed with superintendents and supervisors of work equipment who have been at the point of distraction at seeing their machines misused and abused by roadmasters, foremen and operators; who, without adequate field mechanics or repairmen, have seen costly delaying break-downs in the field; and who, with inadequate shop facilities, have practically despaired of keeping their equipment in proper repair.

(Continued on page 236)

Within the last 25 years, associated with this publication, I have seen all this and much more of its kind—and significantly enough, not all these unfavorable conditions were seen in the early years of the period. Many of these observations have been made repeatedly in recent years, and, unfortunately, but true, could be made on many roads today. Indeed, the millenium in the design, use, care of, and repair of power tools and machines by the roadway and structures departments of the railroads has not been reached.

Big Strides Since 1925

But important and significant strides have been made in all phases of mechanization of the roadway and structures forces. As a rodman on the St. Louis division of the Illinois Central in the early Twenties, I had the good fortune to be on a road that was already fast becoming equipment minded, and the still better fortune of working for a division engineer who had already "arrived" in his thinking. Under his direction, I was to see and make time-studies of such equipment as was then being tried, or used, which included the first model of the Muff-Harris ballast cleaner. This machine, which required that all of the ballast to be cleaned be hand shoveled or forked into a long trough, often head high above the track shoulder, was in striking contrast with the large-scale ballast cleaning machines of today, and even of the last ten or fifteen years. What I saw in the early four-tool tie tamper compressors was equally a far cry from present-day compressors and other types of tie-tamping equipment.

Hand cars had left the St. Louis division when I arrived on the job, and the side-load motor car was definitely on the way out, being supplanted by center-load cars, of which I had one of the best for my field inspection trips almost daily over the road. This car was so satisfactory in its performance and operation as almost to belie the marked improvements made in motor cars in subsequent years.

With hundreds of other railroad men, I well remember rail laying as a 100 per cent hand-tool operation, with its rail-tong gang and batteries of claw-bar men, hand adzers and spikers; and watched it change to a highly organized, fully mechanized operation, from unbolting to final anchoring. And happily, I saw the passing of an era, back in the early Thirties, when there was overemphasis on the number of rails laid per day, to one in which quality work, with full care of the new rail, has priority over speed.

Along with many of you, too, I have witnessed the great development that has taken place in earth-moving equipment, the swing toward the use of off-track equipment of all types where at all feasible, and, still more recently, with much the same purpose in mind, the trend toward the use of motor trucks for the transportation of men, tools and materials to and from the job.

The trend toward off-track equipment, which started well before the recent war, both to avoid interference with traffic and to minimize interference by traffic, still continues, and for the same reasons, but there has been a resisting viewpoint which insists that many track operations necessarily call for the use of on-track machines, and that only such machines are practicable for these operations. Thus, while many machines, such as cranes, air compressors, electric generators, weed mowers and ditch-cleaning units, have taken to crawler or wheel mountings for operation along the track shoulder, all of them are still available in rail-bound models, which are still popular, especially for use in conjunction with large-scale operations which, in themselves, call for slow orders or full use of the track. At the same time, there is little or no resistance to the use of large-production units on track, and, as a matter of fact, most of the more recently developed machines for large-scale surfacing and ballast renovation are of this type.

But definitely, even though gradually, the movement of men, tools and materials, and in many cases machines, has been leaving the rails and taking to the highways, and to roadways along and on the right-of-way. This practice was first evidenced at terminals, in dense-traffic territories, and in areas served by radiating rail lines which could be readily reached cross-country, and even spread during the war years when the roads, in spite of the higher priorities held by others, purchased as many as 360 highway vehicles a year for use by their maintenance forces. The situation today is clearly indicated in an article entitled, Trucks Getting Toe Hold in Maintenance Operations, which appears in this issue.

Still Lower Unit Cost the Goal

These developments and trends are almost too obvious to warrant comment, and certainly to dwell upon, but they are not without great significance as maintenance officers, in the face of higher labor costs, strive to cut unproductive time, increase man-hour production, and lower unit costs. And this striving will continue, with the assurance that the next 25 years will see still more widespread mechanization, more intensive mechanization, and more intelligent mechanization than the quarter century just passed. Of a certainty it seems, at least for out-of-face heavy-duty operations, machines will become larger, heavier and more complicated, if necessary, in order to increase their output, and their initial cost will assume less and less importance as they demonstrate unmistakably their ability to lower unit costs. At the same time, for spot or patch work, it can be expected that power tools and machines will become lighter, more sturdy and more efficient to increase their reliability and productivity, and the ease with which they may be operated and handled to and from the job.

At war with this trend toward more and better machines, and likely to assume major proportions if unit costs are not further reduced by mechanization, is the insistence of many maintenance men on greater permanence in all phases of roadway and track construction and maintenance, to minimize, if not preclude, many routine maintenance and repair operations as they are thought of and accepted today. These men see large opportunities in this respect, and it is inevitable that they will have their way if it is demonstrated that it is more economical to buy permanence than to carry out periodic maintenance and repair with men and machines.

Equipment Needs Greater Than Ever

Held back by uncertain economic conditions, railway officers indicate they will buy an estimated 8,600 power tools and machines in 1950, at a cost of about $17,500,000—but want more.

To complete 1950 surfacing programs, involving more than 25,000 miles of track, the work must be mechanized to fullest extent

• Opposing forces vying with each other for control over work-equipment purchases during 1950, with neither, as yet, having much advantage over the other, have kept the number of units of equipment scheduled for purchase during the year at about the same level as the number bought in 1949. One set of these forces—the forty-hour week, with its corollary high wage costs—is relentlessly tending to force purchases upward, and if not equalled in strength by the other forces—unpredictable strikes and declining traffic—will undoubtedly catapult equipment purchases to record heights.

That the contest between these forces at present is at a practical stalemate is indicated by the replies received from the chief maintenance officers of a group of representative roads who were questioned by *Railway Engineering and Maintenance* as to how many power machines and tools they expect to buy this year. Answers were received from offices of 36 roads. From these answers, and the fact that fewer than the usual number of detailed answers were received, it is apparent that many railway officers find it impossible to state at this time, or are reluctant to make public, their complete plans for the year. Many frankly said as much, while others said that they had committed themselves only to the extent of their minimum needs. However, in spite of the reluctance of many to make definite commitments, enough basic facts and details were made available to indicate that the level of equipment purchases in 1950 will ultimately be at least as high as last year. All agree that the need for mechanization, and the opportunities for dollar savings thereby, have seldom been greater.

Of the 36 roads making reply to our inquiry, 27 officers, representing 132,558 mi. of line, reported that they plan to purchase about 2,700 units of work equipment in 1950—300 less than in 1949. Six stated that although they formerly purchased equipment in relatively large amounts, unsettled conditions prevent them at this time from knowing exactly how many units they will buy during the year. The other three officers gave tentative amounts of money they expect to spend, but said they were unable to be specific as to the number of units of equipment to be purchased.

On the basis of the actual number of units included in the budgets of the roads that furnished specific information, and giving consideration to the volume of both large and small machines bought in recent years, it is estimated that all the railways in the United States and Canada are planning to buy a total of about 8,600 units of equipment in 1950. This total includes, as it has in former years, both the heavier types of equipment and the more important portable, power-operated small tools that are being used in ever increasing number, but it does not include many of the smaller appliances that are seldom reported in budgets or in yearly purchases. This volume of contemplated purchases compares with 8,700 units of power tools and machines purchased in 1949, as reported in the January issue. Because of the increasing number of large, expensive types of equipment being bought currently, it is estimated that the 8,600 units to be purchased in 1950 will cost $17,500,000, which is about the same as was spent for equipment in 1949.

In many respects the indicated leveling off of work equipment purchases to last year's level is surprising. The basic reasons for the purchase of work equipment and roadway machines have long been established. The shorter work-week, starting last September 1, not only put into effect the highest wage rate yet known in the maintenance-of-way department, but posed the problem of getting as much work done in five days as had theretofore been done in six. More mechanization seemed the logical solution. In fact, more than 70 per cent of those railway maintenance officers replying to a questionnaire sent out by a committee of the American Railway Engineering Association asking the roads their plans for combating the 40-hr. week, indicated that they contemplated buying more units of both the present types of machines and of entirely new types. On such a basis as this, it would seem that nothing less than continued "unsettled conditions in the coal in-

dustry", as one officer put it, and other uncontrollable factors tending to reduce traffic, could possibly prevent the volume of equipment purchases from rising.

Officers Confirm Need

This opinion is confirmed by the statements of many of the chief engineers who gave *Railway Engineering and Maintenance* information as to their proposed purchases of work equipment. One of these officers said, "It is our intention to buy every piece of labor-saving equipment that will justify its purchase price by savings in man-hours, in order to make up in part for the eight hours of productive work per man that we have lost by reason of the five-day week." Another said, "Although we have lost one strong reason for the purchase of machines, by virtue of there being no indicated shortage of labor in the near future, we still have the need for increased speed of production as a major justification for investing in equipment." Still another officer was even more specific and emphatic in announcing his plans for the coming year. He stated bluntly, "We expect to spend considerably more in 1950 for work equipment than we have for the past several years."

From other similar replies, it is apparent that the larger roads, most of which have long since mechanized their maintenance-of-way forces "to the hilt", will continue to purchase equipment at no less than the rate of former years, economic conditions permitting. At the same time, many of the smaller roads which formerly found it impossible to provide enough work on a full-time basis to warrant the purchase of machines, are now finding it economically feasible to invest in work equipment. In their cases, the shorter work-week has so lowered the available number of working hours as to make mechanized operations now desirable, with the added attraction of lower labor cost per unit of work accomplished. It is such aspects as these that point to a higher volume of equipment purchases once present deterring economic influences disappear.

That such expectancy of better times is not wishful thinking is indicated by the fact that one equipment manufacturer reports that orders so far this year are higher than they have been in many previous years. This manufacturer, which is already supplying a number of types of equipment for maintenance-of-way work, is confident that intensified mechanization of the maintenance-of-way forces is inevitable. Backing up this confidence, this company has several other units of equipment in or beyond the drawing-board stage—some even on test—and is constantly endeavoring to improve its present machines.

Still another indication that mechanization of maintenance-of-way operations will expand during the year is contained in the reports of the engineering officers of the railways of the United States and Canada concerning their rail, tie, ballasting and surfacing programs for 1950. On the basis of these reports, it is estimated that the programs of the roads as a whole will include the laying of approximately 1,730,000 tons of new rail, the installation of 36,600,000 crossties, the application of 33,300,000 tons of ballast and the out-of-face surfacing of more than 25,000 mi. of track. Such represents a lot of work, and when it is realized that, under the five-day week, there are only 149 working days this year between the first of April and the first of November, it is inconceivable that such programs can be completed without the work being highly mechanized.

Bridge & Building Needs

While the need for mechanizing track operations grows apace, the demand for power tools and machines for use by the bridge and building forces is also increasing. In their replies to questions relative to the amount of money to be spent for bridge and building maintenance in 1950, 24 officers reported they would spend more than $32,000,000 on bridges, and $43,000,000 on buildings. Bridge maintenance work will be more extensive this year than last on 11 of these roads, less on four, and about the same on the remaining nine roads. Building work will be greater in 1950 than in 1949 on eight roads, less on five, and about the same on 11 roads. As in the case of track-work programs it is doubtful if such a large volume of work as is planned by the bridge and building forces for 1950 could be accomplished without employing machine methods. Without mechanization, these programs would necessarily either exceed the expenditures now authorized, or they would have to be curtailed. Neither alternative is desirable. Thus, as in track work, the demand for equipment is high.

With the demand for power tools and machines so high in both the track and bridge and building departments, it is evident that only a recession in general business, and strikes, with their devastating effect on traffic and earnings, will hold equipment purchases in check. At the same time, optimism among business analysts is increasing daily and it is conceivable that many of the present deterrents to improved business conditions will have removed, or at least diminished, before the middle of the year. If such should happen, the needs of the railways to make up for lost time, and to get better work done quicker at less cost, will surely assert itself in larger equipment orders than are now anticipated.

The utility of truck cranes is making them popular for use around terminal areas

Why Equipment Builders GET GREY HAIR

Henry H. Talboys

By HENRY H. TALBOYS

Vice-President in charge of
Railway Equipment Division
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Milwaukee, Wis.

Reproduced here is an open letter to the editor from a prominent and respected representative of the railway supply industry, in which the writer "takes his hair down" and points out candidly some of the problems of the manufacturers of power tools and machines in serving the railways most effectively, and how the fullness of this service is sometimes limited by conditions that call for correction by top railway management.

TO THE EDITOR:

If I can say anything in this letter that will awaken some on the railroads, particularly those in top management, to the greater possibilities inherent in the use of machines in maintenance-of-way operations, I shall be satisfied.

Early in January, you wrote to me, in part, as follows:

"In one of the features contemplated for our March Equipment Economies Issue this year, you could, if you will, make a highly constructive contribution—in the interest of both equipment manufacturers and your friends on the railways.

"We have in mind the presentation, by an outstanding equipment builder, of an article under some such title as 'Behind the Scenes in the Development of Efficient Roadway Machines', and we know of no one with a better background of experience, or in a more representative company, than you to prepare such an article."

Time, unfortunately, will not permit my complying with your suggestion for a comprehensive article, but, in lieu thereof I am glad to dictate some of my thoughts on these matters, which I hope will be helpful.

My entire time and energy for the past 25 years has been devoted to the railroad industry. I am vain enough to believe that I have contributed something. I still want to contribute. Do not mistake me. This has not been entirely a labor of love, but there has been a lot of fun and satisfaction in it. Fortunately, my company has found our railroad business profitable. If it had not been profitable, my management would not have allowed me practically complete freedom to develop any tools for which the railroads express the need.

Encouraged by M/W Men

The real development and use of machines for working railroad track started less than 30 years ago. Our company got into it 25 years back when the pinch of immigration restrictions shut off cheap labor from Europe and when other forms of transportation began to cut into railroad revenues. At the start, money for the purchase of roadway machines was hard to get from "top brass."

The one thing that was encouraging though, and which kept many of us manufacturers plugging along in the face of slow progress in the acceptance of mechanization, was the attitude of maintenance-of-way men. Their outspoken and freely voiced appreciation of our efforts was an inspiration, and I know that it kept many of us going. We realize how discouraging it has been to M/W officers to be turned down on the purchase of a few machines that would repay their first cost several times over in the first year of use.

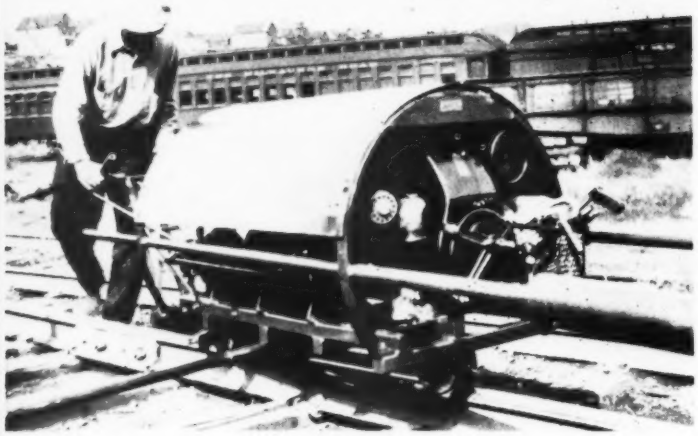
But let's look at the human, manufacturing and engineering angles of equipment building for a moment. What starts a development in any particular type of equipment? In many cases a maintenance man asks the builder whether a machine can be designed to do a certain job to replace "main strength and awkwardness." In others, some one with an inventive turn of mind, seeing a gang laboring at some job, has an inspiration for a machine that can do the job faster, cheaper and better.

But the birth of an idea is not enough; it is still necessary to convince the financial end of the builder's business that the machine will sell and that the development will be profitable. Often decisions to go ahead must be completely a matter of judgment and faith. I know of no case where a railroad has agreed in advance to purchase a specific number of machines, if such were developed. In other words, all new and revolutionary machines developed have been strictly a gamble of men's time and money—mostly the builders.

Design for Worst Conditions

In designing a roadway machine, a number of very important things must be kept constantly in mind:

(1) It must do the work faster and better.



Early power track wrench — service tested, but superseded before it was ever in production

(2) In most cases, it must be light enough to be moved from the track. This means stronger shapes and more expensive alloys. Roughly, it costs more than a dollar in selling price for every pound of weight taken from a machine.

(3) It must be designed with the thought in mind that it will be used far from a machine shop, and must be able to have worn parts replaced in the field. This means greater accuracy and interchangeability of all parts.

(4) It must be constantly in the mind of the designer that, in many cases, the man who is to operate the machine will receive no instruction whatever, except possibly, which lever to pull.

(5) The designer must also keep in mind that the machine will be used where it will be from 1 to 30 days away from possibly needed replacement parts.

(6) The designer must also have in mind the fact that the operator, in most cases, will have no tools to make replacements and adjustments—not even a screw driver or a pair of pliers.

(7) Furthermore, the machine must be designed against stupidity and ignorance, because one rough-and-ready unskilled hooligan, without half trying, can do more damage to a machine in a few minutes than would be caused by years of normal service.

Then there is another thing that a manufacturer must keep in mind, and that is that, with few exceptions, very few machines designed for M/W use are sold in large numbers—seldom more than a hundred a year. Only a few times have we sold more than 100 machines of any one type in a year, and this is true of most manufacturers of M/W machinery. Compare this with automobiles, refrigerators, radios, furnaces, etc., where the annual production is in the hundreds of thousands, and even millions. Think what we could do to our costs if we could sell 15,000 to 20,000 adzing machines, track wrenches, or grinders per year. Think of how the expense of tooling per unit could be cut if we had any such large production.

Let's talk about profit for a minute. Who makes the greatest profit on these machines? The manufacturer makes a profit when he sells the machine. If the machine, in operation, will save twice its cost in a year, it then produces a greater profit year after year for the railroad, just so long as it lasts and is kept in good running order — and there is provided a place to use it.

As for the costs of developing new types of machinery, such costs must eventually be paid for by the railroads if the manufacturer is to be successful. The manufacturer must collect his development costs of both successful machines and failures in the selling price of the successful machines. The more profitable a line is to a manufacturer, the more money and encouragement he has to develop new machines, and also to strive to improve each batch of current machines as they are produced.

Machines Used Inefficiently

Now I want to point out why many suppliers feel their efforts to help are often nullified, and why the tools they spend money to develop and market are only partly efficient. I have been told by many maintenance men that M/W machinery, on the average, is used only 50 to 60 per cent of its possible efficiency. Many railroads have a very efficient maintenance-of-equipment department, but, unfortunately, many others do not. Let me quote some case histories:

Many roads, after 25 years of labor-saving machinery, have no field force to repair and keep their roadway machines in good running order. Sometimes, it is true, they appoint a man to be superintendent of work equipment, but they give him no authority and no field help. On many railroads—not all—the repair of M/W machines and the men in the field are under the mechanical department, a department which knows little about their field use and considers them mostly a nuisance. In only a few cases does the M/W department have the maintenance of machines entirely under its direction. This is unquestionably the best set-up, but change to it can only come from the top. Furthermore, few, if any, roads have made a definite attempt to sell labor on the necessity of saving money and time through the use of machines; that a new situation has arisen in the past few years which demands maximum economy; and that it is in the long-term interest of every employee and his job to help reduce waste in the maintenance of track. This is also the job of top management.

One of the largest Class I railroads of the country has bought very little railroad machinery in the past six years. Why? The chief engineer can get appropriation for purchase, but he cannot get his management to give him a maintenance field force, or a maintenance shop under M/W control, to maintain and overhaul his machines. He gave up trying to get his machines properly overhauled in the regular M/E department shops and attempted to send them outside for annual overhaul, but the shop crafts in the M/E department stopped that. This chief engineer said, and correctly so, that it did not pay to buy machines when so little work could be obtained from them. No one but "top brass" can correct this kind of a situation.

Neglect Field Maintenance

Just last year I visited a rail-laying gang where four air hammers were being used to drive spikes. One compressor had capacity for the four hammers but there were two spare compressors on hand as they were all in such poor repair that it was considered necessary to have three compressors in order to insure always having one in usable condition. And I was told that the day before I was there all three compressors were down.

In a well mechanized rail-laying gang of 60 men, at least 60 per cent of the work is done by the machines. In such a gang there will be a head foreman and four

or five subforemen—one for each 10 or 15 men. This means that the machines are doing the equivalent of at least 90 men. If there is not a good mechanic with the gang to keep the machines in top condition, it is like using 90 men without any foremen over them.

Often, when traffic is off and retrenchment must be made, orders go out from the top that there is to be no overtime—and this usually means "across the board". This, of course, includes the equipment maintainer. What is the result? In order to maintain the machines, they must be taken out of service during the working shift. Of course, no gang foreman will allow this to be done and disrupt his production, so the machines are run until they "just quit." No time is allowed for preventive repair, so that when the machines do go out of service, they are usually in terrible shape and cost a lot more to be repaired, to say nothing of the disruption to the gang's regular production.

On one job, I kept two of our servicemen working from 4:30 to 7:00 two consecutive nights, to get four machines in repair for the next shift. The regular railroad maintainer went into camp with the gang at 4:30 as he was not allowed to work overtime, even though two of the machines, each night, were absolutely down and would not have been ready to work with the gang the next morning.

Too Much Red Tape

Following is a report from one of our servicemen, sent in last year:

"The foreman of the steel gang told me about 15 per cent of the time lost on machines is due to lack of parts—not making the repairs themselves, but in getting the parts. Without a maintainer on the job there is no one to look after the ordering of parts, and when a machine goes down they have to call on a motor car maintainer to find out what is needed and then order from S..... The result is that they must have twice as many machines on hand as are actually needed to do the work. I know of two adzing machines at A..... that have been sitting there for two weeks waiting for parts."

Today, all kinds of businesses are suffering from what I call red tape "worm". It is not confined to the railroads by any means, but it is very costly to any organization. And it cannot be corrected by its immediate victims. Generally speaking, only the men at the top have the power to eliminate such red tape.

The first adzing machine, shown at the right, was a far cry from the present machine so widely used in rail-laying work

Following are extracts from another report sent in by one of our servicemen:

"A third bad situation is the routine followed on this road in returning defective parts to the company from whom purchased. This must be handled by the following procedure:

(1) Foreman notifies storeroom he has a part that is defective.
(2) Storeroom writes head office.
(3) Head office writes back, sending special form (questionnaire) through the storekeeper to the foreman.
(4) Special form is answered by foreman.
(5) Foreman sends form to storekeeper.
(6) Storekeeper checks it and sends it to main office.
(7) Main office sends back permission to foreman to return part.
(8) Foreman sends part to storekeeper with notification of permission to return.
(9) Storeroom returns part.

Results: Six months of red tape and $50 worth of handling for a part—even a 35 cent gasket."

The above is a condition about which the manufacturer can do very little, except to be more careful in shipping correct parts, free from defects. And we all are trying, but admittedly do fall down in this respect once in awhile.

In the past few months, with the start of the 40-hr. week, there has been a lot of talk by top executives about mechanization. They ask for new types of machines to increase production per man. They ask, "how can you suppliers help us." Many questions like this have come to me recently. Many suppliers are doing their best to help, just as we are at our plant, where we are working overtime on six new roadway developments. I would like to ask these same top executives, "what are you doing to help your maintenance-of-way people get more efficient use out of your roadway machines?"

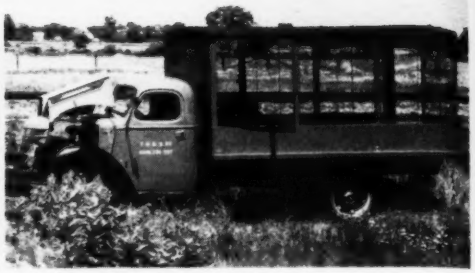
There are very intelligent, capable men in charge of our railroads, but it is evident that they are often so busy they don't always know what is going on or what the detailed needs are. No matter how capable a man is, his judgment is no better than his information.

Better Machine Use Urged

Now do not misunderstand my motives from the tone of this letter. This is not a plea for the railroad to buy more machines, but rather a plea that they make better use of the machines they now have. Many railroads are not getting anywhere near the efficiency out of their roadway machines that they should. We want to help them; especially do we want to direct the attention of top management to the able and loyal M/W men who need a lot of help—the kind of help that can only come from the top.

In closing I again want to comment on the fine attitude of M/W men and say that their spoken appreciation of tools which help them is an important factor in determining the policy of manufacturers. I do not believe there is an industry in which the personal relationship between supplier and customer is as cordial and friendly as in the railroad industry.

HENRY H. TALBOYS



Above, left—1½-ton steel-bed, stake-body truck on the C.& N.W., equipped with dump attachment. Center 1½-ton stake-body truck on the Pere Marquette District, with removable housing. Right—One of the frog-welding trucks on the New York Central

This Hy-Rail, combination highway-railway car, is being used on the L. & N.

Trucks Getting Toe Hold in

To minimize unproductive man-hours in transporting men, tools and materials to and from points of work, increase flexibility of movement of gangs, and reduce hazards, the track, bridge and building, water service, signal, welding, and work equipment repair forces of the railways have been turning more and more to the use of highway motor trucks. This article sets forth the situation on 10 representative roads of the country and gives the types of trucks being used by the various departments, pointing out the special features being incorporated in the trucks to meet particular requirements.

• The maintenance-of-way forces of the railways, in all departments, are taking to the highways for transportation to and from work, and for transporting tools and many materials. It is estimated that these forces of the Class I railroads already have more than 6,000 trucks of a wide variety of types in service, and it is no secret that, most roads plan to purchase many more. In addition, some roads rent trucks to fill out their requirements for special jobs and emergencies.

These are the basic conclusions derived from detailed information furnished to *Railway Engineering and Maintenance* by 10 roads as to the use of trucks by their maintenance forces. All of these roads are enthusiastic truck users, have been increasing their fleets year after year, and, with few exceptions, plan to use more trucks where they can be economically justified.

All Departments Equipped

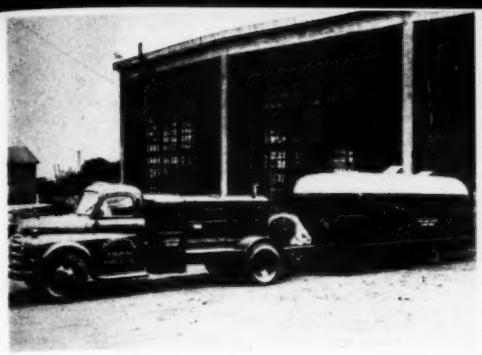
In every case studied the use of trucks has spread to all maintenance departments – track, bridge and building, water service, and signal – and in most cases the roads have several types of trucks in each department to meet the varied requirements. In addition, most of the roads questioned are equipping their work equipment repair field forces, frog welding crews and other special gangs with trucks as needed and found advantageous.

This transformation in force transportation in the maintenance-of-way department has come about largely with the extension of paved and unpaved highways in most parts of the country, heavy rail traffic, and the ready availability of trucks, and it has been stimulated by the increasing practice on many roads of providing access driveways on their own rights-of-way where conditions permit. But the overall basic and compelling reason behind the growing use of trucks—to which all agree—is one of economics, to cut down the unproductive time of the men in going to and from points of work, whether in large or small gangs, speed up the delivery of materials, supplies, tools and machinery parts, as needed, and eliminate, in some cases, more costly forms of transportation. In addition, on some roads the maintenance forces have been practically pushed off the rails by traffic conditions, and most of them consider truck transportation safer. Of course, many roads will continue to keep their section gangs on the rails in order to provide daily patrol of much of their tracks, but some roads are finding other ways to meet this requirement so even their section gangs can be motorized.

Average Hauls

Where trucks are assigned to section gangs, their travel is frequently limited to the length of the sections involved, but in the case of trucks furnished extra gangs and to the bridge and building, water service, signal, welding, and work equipment repair forces, the average haul is much higher, and maximum hauls are reported to range anywhere from 16 to 30 to 50, and even 100 mi. on the different roads.

The accompanying table gives for the 10 roads reporting the number and assignment of trucks in the maintenance-of-way and structures departments of these roads. The following text tells the types of trucks being used by the various forces on the individ-



Above, left—One of the Pennsylvania's welding trucks, equipped with a house trailer. Center—Dodge Power Wagons are being used by several roads. Right—A signal department truck on the Frisco, fitted with a winch for pulling wires or erecting poles

old in Maintenance Operations

ual roads, pointing out, to the extent that information was made available, the special features incorporated in these trucks to meet the special requirements of the using departments.

D. L. & W.

The trucks furnished to the track forces of the Delaware, Lackawanna & Western are principally of three types—2 ton, with 18-ft. stake bodies; 2 ton, with 12-ft. stake bodies; and 2-ton, 3-cu. yd. dumps. The trucks for transporting men and equipment are fitted with aluminum tops; a separate cab and rear compartment, each equipped with heaters; seat boxes which serve also as tool compartments; tool boxes and compartments on the sides; and retractable steps at the rear, with a tail gate which serves as a balustrade each side of the steps.

The trucks furnished to the bridge and building forces are of two types—2 ton, with 12-ft. stake bodies, and 2-ton, 3-cu. yd. trucks with dump bodies. The stake-type trucks; for transporting men and tools, are similar to those furnished to the track forces.

The trucks furnished the water service forces of this road are all ¾-ton pickups. One and one-half-ton, 12-ft. stake body trucks are provided for the transportation of men, materials and tools in the signal department, and ½-ton pickup trucks are furnished signal maintainers.

The five welding trucks are all 4-wheel-drive Jeeps equipped with 1-ton stake bodies each carrying a 200-amp. arc welder driven by a power take-off. The work equipment repair trucks include five Dodge Power Wagons of 1-ton capacity and two Universal Jeeps. All of these units have specially constructed bodies with compartments for tools and repair parts, and their equipment includes an air compressor for the operation of air tools and for the pressure greasing of machines; a chain hoist on a longitudinal trolley beam which extends over the rear of the truck; oxygen and acetylene containers; and a tail gate which serves as a work bench, equipped with a vise.

Pennsylvania

Of the 600 trucks assigned to the maintenance-of-way and structures forces of the Pennsylvania, 70 per cent are used by the track forces, 15 per cent by the bridge and building forces, and 15 per cent by the telegraph and signal forces.

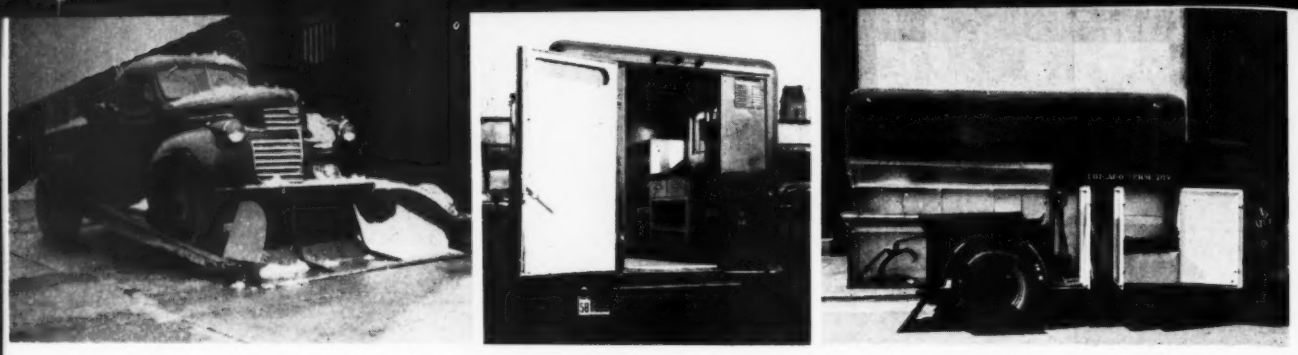
Passenger buses are being used by several roads to carry men to and from work

Fifty per cent of the trucks have van, canvas-covered express, or stake-type bodies (with body lengths of 9 ft. and 12 ft., designed primarily for handling materials), some of which are equipped with hinged or bin-type side seats for use occasionally when hauling men. Thirty per cent of the trucks have express-type bodies, 9 ft. and 12 ft. long,

Number and Assignment of Trucks to Maintenance-of-Way and Structures Forces

Road	Total Number	Track		B. & B.		Service Water		Signal		Frog Welding		Work Equip. Repair	
		Number	Per Cent Equipped	Number	Per Cent Equipped	Number	Per Cent Equipped	Number	Per Cent Equipped	Number	Per Cent Equipped	Number	Per Cent Equipped
Boston & Maine	43	8	8	18	40	0	0	8	10	2	100	7	100
Chesapeake & Ohio, Pere Marquette Dist.	176	89	56	20	100	7	100	47	67	3	**	10	**
Chicago & North Western	116	53	**	36	45	23	60	4	5	0	0	0	0
Delaware, Lackawanna & Western	86	31	50	17	100	6	100	20	50	5	40	7	100
Denver & Rio Grande Western	61	27	10	11	25	6	50	12	10	0	0	5	50
New York, New Haven & Hartford	250	116	47	54	90	x	x	50	50	4	100	26	100
New York Central Lines West, M.C., Big Four	191	114	25	45	30	10	40	*		14	30	8	25
Pennsylvania	600xx												
St. Louis-Southwestern	120	89	60	7	15	5	50	7	25	6	15	6	60
Southern Pacific, Pacific Lines	292	102	12	56	50	56	60	51	90	14	30	13	100

*Not under jurisdiction of maintenance-of-way department.
**Not given.
xNo forces designated as such.
xxInformation not subject to tabulation—see text.



Left—Dump truck on the Pennsylvania, equipped with snow loader. Center—Rear view of work equipment "shop on wheels" on the Pennsylvania. Right—Track gang truck on the Pennsylvania, with inside seats and outside, built-in tool bins and compartments

which are designed for hauling both men and tools. These units have outside tool bins and compartments built into the sides and bin-type seats built into the interior.

Seven and one-half per cent of the road's maintenance department motor vehicles are equipped with either 2-cu. yd. or 3½-cu. yd. dump bodies, while another 7½ per cent are small trucks equipped with maintainer-type bodies, and are used by telegraph and signal maintainers, bridge inspectors, and similar forces. The remaining 5 per cent of the motor vehicles in the maintenance department comprise miscellaneous types, such as buses with either 13 or 29-passenger capacity; work equipment repair trucks, known as "shops on wheels"; lineman's and substation trucks, and those specially constructed for use by the road's frog welding forces, which carry an electric arc welding generator and are designed to pull a house-type trailer for use by the men. In addition to all of this highway equipment, the road also has seven low-bed, heavy-duty highway semi-trailers and highway truck-tractors for transporting roadway machines and materials over the highways. Several of these units are worked in conjunction with crawler tractors which are used as auxiliary wrecking equipment.*

Boston & Maine

The trucks used by the track forces on the Boston & Maine include ½-ton pickups, 1½-ton racks, and 1½ and 3-ton dumps. The B. & B. trucks include ½-ton pickup, 1½ and 2½-ton dump, 1½-ton rack, 1½-ton van, 1½ and 2½-ton semi-van, and 2 and 3-ton stake types. The only special features in any of these trucks are removable housings on four of them to shelter personnel.

*A more detailed reference to this latter equipment appeared in the October, 1948, issue of **Railway Engineering and Maintenance**, page 1045.

The trucks of the signal forces include ½ and ¾-yd. pickups, ½ and 1½-ton utility trucks, and 1½-ton semi-vans. The ½-ton utility trucks are equipped with bins for carrying electrical materials, while the semi-vans are equipped with a power winch and portable derrick.

The two trucks of the frog welding forces include one with a 1½-ton rack body and one with a 1½-ton stake body—each being equipped with an arc welder mounted on the chassis. The eight trucks of the work equipment repair forces are either ½-ton pickup or ½-ton panel body, both with specially built-in cabinets for carrying tools, parts and small materials.

D. & R. G. W.

The 27 trucks used by the track forces of the Denver & Rio Grande Western are all 1½-ton, with stake or dump bodies—some being equipped with winches. The trucks furnished the B. & B. forces of this road likewise have 1½-ton stake or dump bodies, these being equipped with winches, seats, canvas tops over bows, and sheet-metal sides. The trucks furnished the water service forces are either 1 ton or 1½ ton, with stake bodies. The 1½-ton trucks have a four-speed transmission and built-in material and welding equipment racks.

The signal forces have ½-ton panel and 2-ton stake-body trucks, without special features, while the work equipment road mechanics have ¾-ton pickups, 1½-ton trucks with stake bodies, and 1-ton trucks with panel bodies—all equipped with racks and bins for tools and parts.

North Western

The trucks used by the track forces of the Chicago & North Western are assigned primarily to the larger maintenance gangs. Most of these trucks are 1½ ton, with stake bodies, equipped with hydraulic dump attachments, and most of them have canvas-covered bow tops, and are equipped with folding side seats for carrying men.

Thirty of the trucks used by the bridge and building forces are of 1½-ton capacity with stake bodies, equipped with dump attachments, while the remaining six are mostly of 2-ton capacity. Eighteen of the 23 trucks used by the water service forces are of 1-ton capacity with panel bodies, while the remainder are ½ ton with pickup bodies. The four signal department trucks include two of 1-ton capacity and two of 2-ton capacity, all with stake bodies.

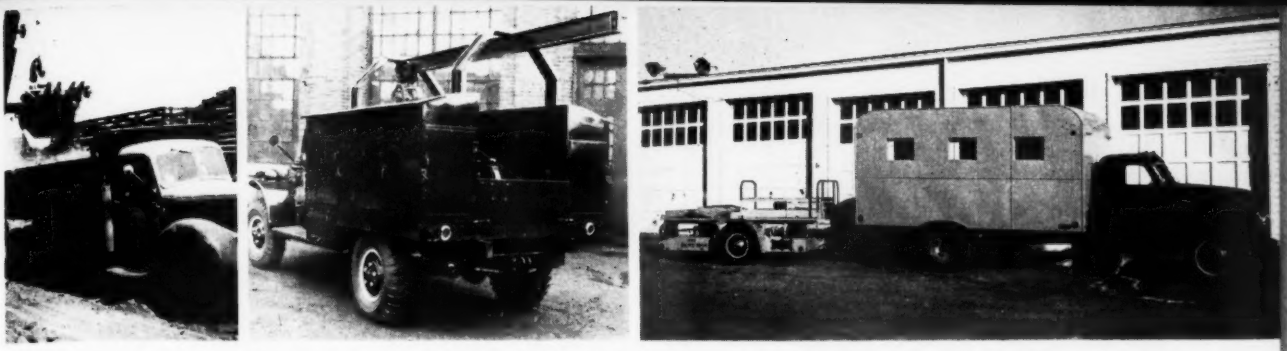
Chesapeake & Ohio

The track department trucks of the Pere Marquette district of the Chesapeake & Ohio are largely of two types—1-ton panel body and 1½-ton panel body—both equipped with tool cribs and racks, and providing all-weather transportation. All of the B. & B. trucks are 1 or 1½ ton, with stake bodies, and have a removable housing for the men and built-in tool racks and cribs. The seven water service department trucks are all 1 ton, with express bodies, and have built-in bins and racks for tools and materials.

The signal department trucks of the Pere Marquette district are largely Jeeps, of 1½-ton capacity for the maintenance forces and 1½-ton capacity for the construction forces. The three trucks used by the track welding forces are ¾-ton express type, while the ten trucks used by the work equipment forces are of ½-ton and ¾-ton capacity, with pickup-type bodies.

New York Central

The 114 trucks assigned to the track forces of the New York Central, Lines West of Buffalo, including the Michigan Central and the Big Four, are of several types,



Left—A dump truck in grading work on the Southern Pacific. Center—Work equipment repair truck on the Lackawanna, equipped with overhead trolley and chain hoist. Right—Frisco truck, hauling a low-slung trailer carrying a motor car and trailer

including 1-ton express, ½-ton and 1-ton panel, 1½-ton and 2-ton stake, 2-ton dump, and van-type school buses. The trucks for transporting men are equipped with removable seats and special steps at the rear.

B. & B. Trucks on N. Y. C.

The B. & B. department trucks are also of a number of types, including ½-ton and 1-ton panel, ¾-ton pickup, 1-ton express, 1½-ton custom body, 2-ton stake, 2-ton dump, and van-type with permanent tops, wire sides and side curtains.

The trucks furnished the water service forces are ½-ton, 1-ton and 1½-ton capacity, with pickup bodies, except for a few of the van type. All of the trucks are equipped with removable seats. The 14 welding trucks are of 1½ or 2-ton capacity, with enclosed steel bodies housing arc welding equipment driven from a power take-off. The work equipment repair trucks are ¾ ton and 1 ton, with express and panel bodies equipped to carry tools and parts, and 2-ton trucks with flat-bed bodies.

St. Louis-San Francisco

The roadway department trucks of the Frisco are of the flat-bed, van and dump types, of 1½ or 2½-ton capacity. The van-type trucks are equipped with seats and folding rear steps. Some of the track forces are also equipped with a special low-slung, pneumatic-tired trailer on which a motor car and push car (the latter with collapsible deck) can be transported behind a truck.

The trucks used by the B. & B. forces of this road are 1½-ton or 2-ton flat beds equipped with a shelter for the men and a winch. The water service trucks are ½-ton and 1-ton pickup, stake and panel types; the panel types being equipped with bins for miscellaneous fittings.

The trucks used by the signal forces are of the van and utility types, of ½-ton and 2-ton capacity—those with utility-type bodies being equipped with a winch for pulling wires or erecting poles with a gin pole. The track welding trucks are of 1-ton capacity with enclosed pickup bodies, and are equipped with a small portable arc welder and with oxy-acetylene welding equipment. The trucks used by the work equipment repair forces are ½-ton panel body, specially equipped with bins for small miscellaneous repair parts and tools.

New Haven

On the New Haven, which was one of the earliest users of trucks in maintenance-of-way operations, the trucks used by the track forces are from 1¼-ton to 3-ton capacity, the ¼-ton type having pickup bodies and the larger trucks (1 ton and heavier) having either panel or stake bodies 12 ft. or 16 ft. long. The B. & B. trucks on this road are similar to those furnished the track forces, except for some dump trucks which are used for special work. The signal forces use ¼-ton trucks for maintainers and 1-ton to 3-ton trucks for their gangs. The welding trucks are equipped with arc welding generators, and the work equipment repair trucks are usually equipped with special storage compartments to carry a small supply of repair parts.

In addition to the trucks, used by maintenance gangs and small crews on the New Haven, many of the track, bridge and building and signal supervisors on the road are equipped with passenger-type automobiles to aid them in supervising operations on their respective districts.

Southern Pacific

On the Southern Pacific, Pacific Lines, the trucks furnished to the track forces are pickups, panels, flat-beds and dumps from ¾-ton to 10-ton capacity. The trucks furnished the B. & B. forces are of the same general types as those furnished the track forces, but some are equipped with power winches.

The trucks furnished to the water service and signal forces include pickups, panels and flat-beds from ¾-ton to 2-ton capacity, some of the water service trucks being equipped with winches and special tool boxes, while some of the signal department trucks are equipped with a power winch and a portable "A" frame.

All of the trucks used by the track welding forces on the road are 1½-ton flat-beds, each equipped with a single-unit welding machine, and providing space for transporting the welding gang. The 13 trucks furnished the work equipment repair forces provide truck transportation for these forces on all divisions. These trucks are pickups, panels and flat-beds.

Operators

The practices on the foregoing 10 roads vary widely as to the operators of their maintenance-of-way trucks and the specific assignments of the trucks. For example, three of the roads assign operators to practically all of their trucks; one assigns operators only to track and bridge and building trucks; three others use both practices, assigning operators where the trucks are used continuously throughout the day; while on still three other roads the trucks are operated by foremen, assistant foremen, or designated men in the gangs. On six of the roads covered in this study the trucks usually stay with the gangs throughout the day, doing other work only as special occasion requires, while on the other roads it is the definite policy to assign the trucks to a wide variety of other work when they are not being used by their respective gangs.

Let's Get More Out o

By J. P. NEWELL
General Manager, Western Region
Pennsylvania
Chicago

J. P. Newell

• The situation confronting railroad management at this time is more serious than at any time during the past ten years. Traffic has been decreasing. Business conditions, particularly in our major industries, have been most unsettled, with resultant adverse effects upon railroad operation. Despite these developments, costs, particularly wages, have continued to rise. The five-day week for the non-operating groups was the most recent burden to be added to the railroads. A similar request, for a five-day week with additional benefits, has been made by the operating employees.

The trend is indicated by the 1949 statistics just released for the Class I railroads of the United States—a 37.5 per cent decrease, compared with 1948, in net income, although the decrease in total operating revenues was only 11.3 per cent.

Must Increase Productivity

In this present situation, increased productivity is one of the most pressing needs in the maintenance-of-way departments of the railroads. This increased productivity – with lower costs – can be accomplished by more intensive, effective and economical use of power tools, roadway machines and work equipment.

The problem of securing this increased productivity is divided into three parts—

(1) To secure greater efficiency and production from our present work equipment.

(2) To secure additional work equipment.

(3) To continue the activities of the past few years in developing new and better types of work equipment.

Much has been said and written concerning the more efficient use of present equipment. The basic requirements are rather obvious. Costly failures must be avoided, idle man-hours must be eliminated, and greater productivity must be secured while the machines are in use.

The proper training of supervision, particularly mechanics, and off-season maintenance and repairs, have been stressed. Failure to recognize their importance represents a great weakness in the effort to secure more production from work equipment. It is not enough to assign a mechanic to the maintenance of a certain number of roadway machines, without first determining that the mechanic is properly trained or qualfied, and that he can physically give proper attention to the machines under his jurisdiction. Mechanics should be furnished with a complete manual of instructions, a list of parts, and the proper tools for each and every type of machine under their jurisdiction. They should be required to take a course of instructions covering the maintenance problems involved in the more complicated machines, and in the general problems involved in taking care of the smaller machines.

In a specified territory they should be carefully supervised by a machine supervisor, who will be held strictly accountable for the proper execution of the overall, year 'round maintenance of machines. This supervisor should plan and organize the winter, off-season repairs; however, it is the responsibility of management to provide the money to see that the off-season repairs are actually made. If management is not providing the necessary funds or an adequate organization to repair and maintain work equipment properly, it must be because the facts and the economics of the matter have not been assembled by the M. W. organization and presented to management in a clear and concise manner.

No one can justify the installation of a left-hand disk crank on a Mole to replace a right-hand part, with a resulting seven-day repair job on the machine; or serious damage to a front-end loader because of lack of lubrication; or a fire in a power-jack due to lack of repairs to a gas leak. We improved the performance of our private automobiles by proper maintenance during the war years, adding several years of life—why not do the same thing with our work equipment?

Teamwork Essential

More efficient programming of work, and better organization of working forces, are other items which must be given attention. They have been stressed in numerous articles, and every capable and intelligent maintenance-of-way supervisor is familiar with their importance. However, basically, the most important requirement to get more out of work equipment is to secure the enthusiastic willingness of each supervisor and each employee to accept his full share of responsibility for accomplishing this objective. Further, it calls for the interest and cooperation of many employees outside the maintenance-of-way department – dispatchers, train masters, operators –all are involved in this problem –and the interest of top officials, particularly superintendents, cannot be overemphasized.

One movement of a rail train and 100 men is of interest in this respect. At the suggestion of the superintendent, who was efficiency minded, the train was detoured over a foreign railroad on one of its long jumps. The detour move not only cost less than the cir-

Abstracted from an address presented before the Maintenance of Way Club of Chicago on February 27.

# of Work Equipment

The author, who rose rapidly from the ranks of the maintenance-of-way department on the Pennsylvania to his present executive position, holds that increased productivity, through the more intensive, effective and economical use of power tools, roadway machines, and work equipment, is one of the most important answers to the growing problem of holding down costs of maintenance-of-way and structures operations.

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cuituous move over the home road, but the rail train avoided one day's loss of productivity.

New Ideas Needed

One very important feature, not to be overlooked, in securing increased efficiency from our present equipment is the need for a continuous flow of new ideas and suggestions from the men involved in the operations themselves. Even though officials and top supervision may be extremely interested in increasing the productivity of work equipment, and are willing to cooperate fully to that end, they are necessary occupied with many other problems. Obviously, therefore, they cannot give their full attention to any one phase of their activities. However, they are only too anxious to have comments, suggestions and ideas from those men directly connected with the actual operation of the machines.

This same thought applies in securing additional work equipment for use in maintaining the railroad—progressive managements welcome suggestions and recommendations. They realize that additional equipment is desirable if it will assist in overcoming the maintenance problem by securing the same production at reduced cost or by increasing production. They realize full well that maintenance-of-way labor costs have increased approximately 175 per cent in the past 10 years, and that at the same time efficiency has decreased 15 to 20 per cent due to more restrictive working agreements.

They note with concern the gradual increase in the maintenance-of-way ratio, which on the Pennsylvania Railroad has shown a progressive increase during the last 12 years, and now stands 28 per cent over 1938.

That they have welcomed requests for additional machinery of the proper kind is evidenced amply by the tremendous increase in work equipment on the railroads. The Pennsylvania's investment in roadway machinery and work equipment has increased 30 per cent during the past 10 years, and now totals $20,793,000. This represents a total of 2,870 pieces of equipment, exclusive of track cars.

Detailed analysis of the use of this work equipment on the Pennsylvania, as outlined in the March, 1949, issue of *Railway Engineering and Maintenance*, indicates to us that each one thousand dollars invested in roadway machines, work equipment, and miscellaneous power tools used in maintenance work, has resulted in an annual saving of 3,500 manhours.

It should be clearly obvious to all concerned that any progressive management is vitally interested in additional work equipment—provided it can be justified. They cannot afford to be otherwise.

The responsibility for providing proper information to justify the purchase of additional work equipment rests with the supervision and other officers in the maintenance-of-way department. They must keep abreast of the conditions on their territory and the equipment which can be used to greatest advantage. All departments may be involved in securing the factual data; and additional costs, such as those resulting from increased investment, maintenance costs on the new equipment, etc., should be considered, as well as the gross savings which will be secured.

New Machines Needed

Review of the problem with representatives of the railway supply industry might be advantageous. The end result should be a fully-developed, accurate presentation of the facts upon which management can act. Unless this is done, and the use of work equipment continually expanded, you will not be able to secure the maximum benefits from the use of work equipment.

New work equipment and roadway machines continue to present great possibilities. In the past few years the activities of the railway supply industry have been outstanding in this respect. In cooperation with railroad maintenance officers they have developed power tools and machines which were but a vision ten years ago.

Maintenance men are familiar with most of these new developments, but one which is worthy of comment is a new tamping machine recently developed on our railroad. This machine mounts 24 pneumatic tie tampers, can be operated by 3 men, and can raise and tamp 500 to 700 ft. of track per hour. One of these machines, the pilot model, was tried out in the Pittsburgh area last fall, and a number of them will be in service on the Pennsylvania during the coming summer.

Future Requirements

New machines needed in the future are those which will eliminate the most costly items of work still being performed manually. Machines are needed to reduce the labor incident to tie renewals, to level and shape various types of ballast, and to cut brush, weeds and grass on uneven terrain, particularly in branch-line territory. Additionally, there must be continuing effort to provide more off-track equipment which will produce satisfactory results and replace on-track equipment, thereby improving the utilization of the machinery and reducing the amount of interference to train operation.

We **can** get more out of work equipment—we **must** get more out of work equipment. It is the only answer to the problem now at hand if the standard of maintenance on the railroads is to be retained at its present high level. The controlling factor is the willingness of each supervisor and employee to accept his full share of responsibility in this effort.

New Equipment Puts Skids Under Y

Last year the Elgin, Joliet & Eastern placed in service a two-machine team of yard-cleaning equipment that has revolutionized yard cleaning on this road, sharply reducing costs and speeding up operations. Details concerning construction and operation of these machines and benefits being realized are presented in this article.

Above—The Elgin, Joliet & Eastern's yard-cleaning equipment in operation at Kirk yard. The cleaning unit in the foreground removes debris from the track and piles the material in windrows, while loading unit behind scoops up the windrows and conveys dirt to push-car-mounted dump boxes. Below—Close-up view of the loading unit

• In 1948 the Elgin, Joliet & Eastern spent $12.35 per cu. yd. for removing debris from its Kirk yard at Gary, Ind. But in 1949 the cost of the work at the same location amounted to only $4.37 per cu. yd., or only about one third as much. This remarkable saving was accomplished through the use of special yard-cleaning equipment designed by, and built under the direction of, three of the road's maintenance officers. This equipment consists of two units—a track cleaner which removes debris from the track, throughout the length of the ties, and deposits it in windrows outside the track rails, and a loader which, following behind the cleaner, scoops up the windrows and deposits the material into special cars for disposal.

A high standard of yard maintenance, both to reduce track maintenance costs and increase safety, has long been a policy of the E. J. & E., and in carrying out this policy the road has spent large sums of money for yard cleaning. The new cost-cutting equipment, therefore, has opened the door to substantial savings. For example, the experience gained in the 1949 operations of the equipment in Kirk yard alone indicates that, in addition to a marked improvement in safety conditions at the yard, the yard-cleaning machinery paid for itself in a very few months' operation.

Another benefit of the new equipment, and one that will be

After boxes are loaded, dirt is dumped...

Yard-Cleaning Costs

If depth of debris does not exceed 4 in., track cleaner will remove it in one pass

especially appreciated by the operating department, is its high speed of operation. Any tracks taken out of service for cleaning can now be given back to the operating department in a surprisingly short time. In fact, tracks in Kirk yard that formerly required four 8-hr. days to clean, are now machine-cleaned in about 4 hr.

Previous Method

Yard cleaning on the E. J. & E. was accomplished in the past by gangs of 35 to 40 men with the aid of 2-yd. hydraulic dump boxes mounted in pairs on push cars. These boxes were loaded by hand shovels and hauled by motor car to an elevating conveyor located at some easily accessible spot. Here the loads were dumped into the hopper of the conveyor for loading into gondola cars for final disposal.

Wage increases of recent years had raised the cost of yard cleaning by this method to an exorbitant level. As a consequence it was decided that the work must be mechanized to hold the cost within reason, but a study of available equipment disclosed there was none that was entirely suitable. It was decided, therefore, to investigate the possibility of developing suitable equipment.

S. H. Shepley, assistant chief engineer, R. V. Dangremond, roadmaster, and G. P. Lokotzke, supervisor, bridges and buildings, jointly took over this task in June, 1948, and by April, 1949, had developed and built equipment that seemed to be the answer. This equipment was worked in Kirk yard throughout the 1949 season and produced the striking results already referred to.

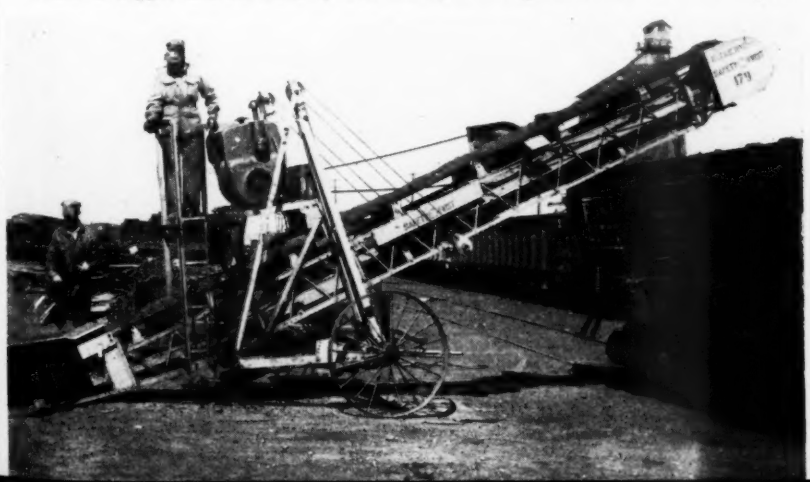
Impeller Is Key Feature

The cleaning machine is a track-mounted (but not self-propelled) unit incorporating a unique rotating impeller that kicks the dirt between the rails (except particles larger and heavier than a common brick) in a forward and upward direction at a high velocity. This material is propelled through a curved, steel, hood-like baffle downward onto a horizontal transverse flat-belt conveyor located near the front end of the machine. A plow is provided on each side of the machine for cleaning areas extending from the track rails to 3 ft. outside the rails.

The impeller consists essentially of a horizontal tube, transverse of the track, which has four longitudinal rows of wire-rope bristles extending radially from the surface of the tube. The ends of the tube are fitted with short lengths of steel shafting which rest on bearings. As the impeller rotates, the wire rope bristles sweep the area between the rails.

The impeller is mounted on a separate steel frame which fits inside the main frame of the machine. The front end of the impeller frame is hinged to the main frame while the rear end is connected to the main frame by a hydraulic ram. By operating the ram, the impeller can be raised or lowered as desired. A 20-hp. gasoline engine drives the impeller through a double chain and sprocket drive.

... into a hopper and elevated by belt conveyor into gondola cars for final disposal



Conveyor Reversible

The transverse belt conveyor is driven hydraulically by the impeller engine, and is reversible, so that the debris can be carried to either side of the track as desired.

The plow on each side of the machine consists of a heavy structural angle 6 in. deep, welded to and carried by a pipe frame which is fastened to the main frame of the machine. A special arrangement permits raising the plow assembly to a vertical, non-operating position, and also adjusting the cutting edge to the desired depth. The cutting edge of that portion of the plow extending from the rail to the ends of the ties consists of heavy fabric and rubber belting. This material has been found to be flexible enough to follow the contour of the tie tops, yet strong enough to remove debris and dirt.

How the Cleaner Operates

In operating the machine the impeller is lowered until the wire-rope ends just clear the tops of the ties. The plows also are lowered to a horizontal position and adjusted until their cutting edges barely clear the tie tops. Then, with the impeller rotating and the conveyor in motion, the machine

Side view of the cleaning machine, showing how it is coupled to the motor car

is slowly pushed or pulled along the track by a heavy-duty motor car. The debris that is kicked onto the conveyor by the impeller is dumped in a windrow on the track shoulder or in the middle of the intertrack space. Meanwhile the plows clean the areas outside the rails, one of them pushing the material into the windrow of material discharged from the conveyor, and the other making a windrow on the opposite side of the track. When moving through a turnout from one track to another the impeller is raised by the hydraulic ram to clear the rails and is held in that position by a safety device. The plows are lifted to a vertical position, when desired, by hand.

If the depth of the dirt and debris does not exceed 4 in., the machine will remove and pile the material in a windrow in one pass. Furthermore, as mentioned previously the impeller will pick up individual particles up to the size and weight of a common brick. Passage of the machine leaves the track behind so clean that the tops of all ties are fully exposed, regardless of variations in their height. And this is done without damage to the ties.

The loading unit that follows the cleaning machine to pick up the windrowed material consists of a chain bucket-type elevator with a horizontal belt conveyor, both of which are mounted on two rubber-tired wheels. This unit, when in operation, is closely coupled behind a Fordson rubber-tired farm tractor. The bucket elevator, built to specifications of the E. J. & E., is powered by a 11-hp. gasoline engine. The horizontal conveyor is identical to the one used on the track cleaner and is powerd by a 4.1-hp. air-cooled gasoline engine.

How Debris Is Loaded

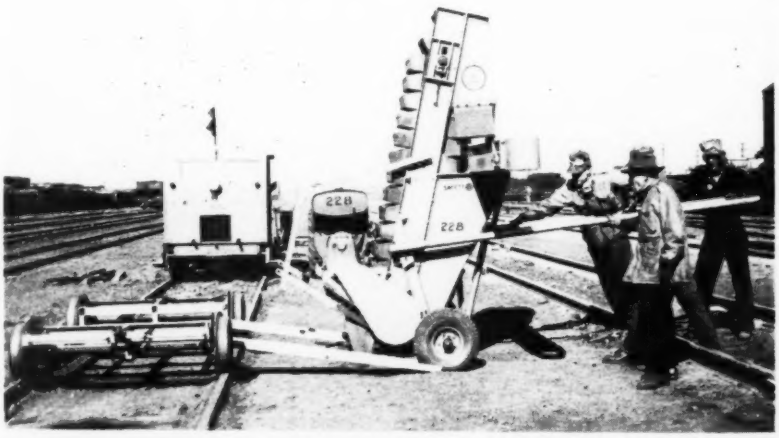
The front end of the tractor is equipped with in-gathering wings which guide the material into the buckets of the elevator as the tractor moves along straddling a windrow. The buckets raise the material and dump it onto the horizontal conveyor, which carries it to the push-car mounted dump boxes on an adjacent track. After a string of dump boxes has been loaded, the dirt is disposed of, as formerly, by dumping it into a conveyor which loads it into a gondola.

The loading unit, when uncoupled from the tractor, can be easily moved about and, with the aid of simple channel ramps, can be pushed over rails by two men. For transporting the uncoupled unit from one location in the yard to another, the E. J. & E. has constructed a special track-mounted carrier onto which it can be easily loaded by two men with the aid of the ramps.

Force Required

Operation of the equipment described in the foregoing requires a foreman and six men, the latter including a laborer to operate the motor car that tows the track cleaner; a machine operator for the cleaner; a laborer to remove heavy pieces of debris from the track being cleaned, who also assists in leveling the debris falling into the dump boxes from the loading conveyor; a machine operator for the tractor-loader unit, who also operates the large gondola-loading conveyor when necessary; a laborer to operate the motor car that tows the dump boxes; and a laborer to level the debris falling from the conveyor into the dump boxes.

The Nordberg Manufacturing Company, Milwaukee, Wis., has taken over the patents on this track-cleaning machine, and is making every effort to place it on the market as soon as possible. This company contemplates producing two different types of cleaning units. One of them will be essentially the same as the track cleaner described in this article. The other will be a self-propelled unit combining in the one machine both the track-cleaning and debris-loading operations.



Showing how the uncoupled loading machine is mounted on its special carrier

Cars kept pouring in on the easterly deck girder span and some dropped to the ground. A crawler dragline was used to clear wreckage from beneath the bridge

MACHINES Save the Day

In Restoring Damaged Bridge

When a freight train became derailed on the Burlington's main line near Thayer, Iowa, the road's double-track steel bridge, 450 ft. long, over the Grand river was severely damaged. However, with the aid of a large concentration of labor-saving equipment the structure was restored to service in 12 working days

•About 6:30 p.m. on Saturday, October 15, 1949, a freight train of 66 cars was moving eastward at 55 m.p.h. on the Chicago, Burlington & Quincy between Afton, Iowa, and Thayer, when the fifth car behind the locomotive became derailed. Before the train came to a stop, 42 cars had been strewn over the right-of-way, about 3,200 ft. of track had been torn up, and two double-track bridges had been damaged, one severely—completely tying up the line. Rising to the emergency, the railroad, in addition to sending the usual wreck train, quickly assembled track and bridge repair gangs and a large assortment of power tools, and restored the line to traffic in 12 working days in spite of the fact that the presence of the derailed equipment greatly hampered and delayed the reconstruction work. The cost of repairing the damage was approximately $250,000.

An investigation of the derailment revealed that a wheel on the fifth car had become loose on its axle seat. This movement resulted in the derailment of the truck. Marks on the track ties indicated that the truck derailed at a crossover near Talmadge Junction. The truck then had bounced along the ties for about 2500 ft. before coming to Bridge 379.64, a double-track plate-girder bridge over the tracks of the Chicago Great Western. Although the inner guard rails at the bridge caused the truck to be straightened out sufficiently to pass over this bridge, the ties, floorbeams, brackets and gusset plates were damaged.

Marks on the rails and ties further showed that the derailed truck then rode roughshod over the ties an additional distance of 686 ft. on an embankment 60 ft. high to Bridge 379.51. This structure consisted of a 150-ft. double-track deck-truss span, 72 ft. high, over the Grand river, flanked on each side by two approach spans —a 105-ft. and a 44-ft. deck plate-girder span. Inner guard rails again straightened out the truck so that it traveled on the bridge ties over the westerly approach spans of this bridge to the 150-ft. deck truss. Then things began to happen—and fast.

Bridge Severely Damaged

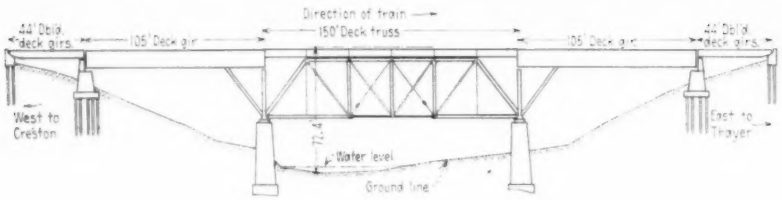
Exactly what then occurred at this point is not clear because all traces of the path of the derailed truck on the bridge were obliterated by the damage that took place. Apparently, however, several of the cars plunged off the bridge to the ground, and the trucks of some of these cars, tearing free from the bodies, plummeted crazily through the maze of stringers, floorbeams, struts and laterals of the deck truss.

While thus causing extensive damage to the deck structure and lateral system of the truss span, some of the derailed cars passed over this span onto the 105-ft. deck-girder span on the other

side, causing the girders supporting the westbound track on this span and the adjoining 44-ft. span to buckle; one of the outside girders was even torn loose from its laterals. As if this wasn't enough, a fire broke out in the spilled contents of a car of lumber and a car of coke, with the result that parts of some of the girders were brought to a red heat, causing them to be badly distorted.

A survey of the situation showed that the damage to the tracks and to the bridge over the Chicago Great Western's tracks was not extensive and could be repaired without too much time and expense, but that the rehabilitation of Bridge 379.51 over the Grand

Above—A railroad-built derrick car was used effectively in dismantling wrecked parts and in the reconstruction work. Left—Elevation of Grand River bridge



river was going to be a longer and more difficult undertaking. Fortunately, the top and bottom chords of the trusses of the main span had escaped injury, as had also the west portal. However, the stringers and floorbeams for both tracks of this span were all damaged, bent or broken. Also, the top strut of the east portal was broken and the cross bracing between the top and middle struts was slightly bent. In addition, the wheels, axles and parts of trucks falling through this span had broken the lateral system of three panels at the top and of two panels at the bottom.

The damage to the 105-ft. span at the east end of the main span was just as severe. The top lateral system, the cross frames and the top flanges of both girders supporting the eastbound track were so badly damaged and broken that they required replacement, while the entire girder span under the westbound track was completely ruined and in a perilous position.

In the 44-ft. girder span at the extreme east end of the bridge, one of the girders under the eastbound track was damaged enough to require renewal, while both girders supporting the westbound track were injured beyond repair.

Until the bridge could be restored to service, some freight and passenger traffic was detoured by the Burlington over its own line from Albia, Iowa, to Des Moines, and thence over the Chicago Great Western to another Burlington connection at Talmadge Junction. Through passenger trains were detoured over the Chicago, Milwaukee, St. Paul & Pacific from Savanna, Ill., to Omaha, Neb., and through freight trains were detoured over the Burlington's lines via Galesburg, Ill., Quincy, Brookfield, Mo., and St. Joseph.

Eastbound Track Restored First

Oddly enough, it was the track on which the derailment occurred, the eastbound main, that could most quickly be restored, and plans for temporary reconstruction were made accordingly. Briefly, the procedure decided upon for restoring the structure to service contemplated the re-use of the relatively undamaged westerly approach spans; the removal of the ruined deck of the deck truss span and its replacement with new bridge ties placed on temporary I-beam stringers and floorbeams; the construction of falsework bents under the two easterly approach spans and complete renewal of the decks on these two spans, along with extensive repairs to their lateral systems.

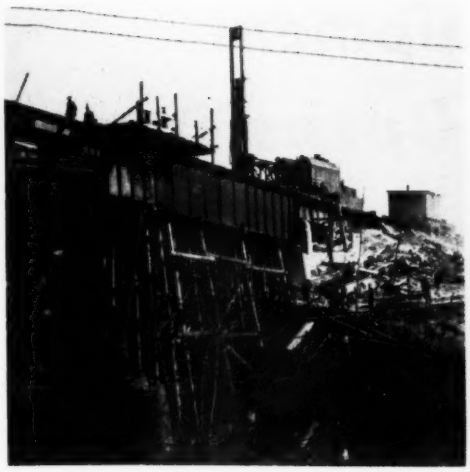
A wreck train arrived at the bridge on Sunday morning, and immediately went to work picking up, rerailing and removing cars.

During this work and the reconstruction operations, a portable telephone outfit proved invaluable for keeping in touch with division and system officers, as well as with the various crews working about the bridge.

A track extra gang of about 35 men and four bridge crews of about 10 men each arrived on the scene, with their camp cars and equipment, on Monday. Men from these gangs started immediately to make track and bridge repairs, and to unload cars still remaining on the bridge. Two 1½-ton company-owned trucks, with stake-and-platform bodies and canvas canopy tops, were used to transport lading from these cars to others at Talmadge Junction, and also to haul workmen, materials and tools to and from the derailment site.

Lights were strung across the structure for night illumination. Three wheel-barrow-type Homelite electric plants and one 10,000-watt Universal electric plant were furnished for this purpose and also to operate an electric drill, two woodborers and a timber saw used in making the bridge repairs.

The supporting structure of the bridge included a steel bent under the west ends of the easterly 105-ft. girder spans. This bent was in danger of being pulled down by the precariously positioned westbound span while cars were being



Driving falsework bents under east approach spans

The eastbound track was made passable to trains in only 12 working days

removed, so a pile driver was brought in to drive falsework bents 20 ft. apart, with six and seven piles each, under the eastbound span to save it. A gondola car had become jammed into the lateral system of these spans and several oxyacetylene cutting torches, some with extension tips for longer reach, were used to burn it loose so it could be dropped to one side.

Two 210-c.f.m. and two 260-c.f.m. on-track air compressors were used to supply compressed air for the operation of a variety of pneumatic tools employed in the reconstruction work. Pile cutoffs on the falsework bents were made with pneumatic chain saws. Holes were bored in the timbers of the falsework bents and of the new decking with air-driven woodborers. As new steel arrived for repairing the cross beams and lateral systems of the damaged girders, two air-driven impact wrenches expedited the bolting up of these members. Three air drills and three riveting hammers also were used for the reconstruction of the steel. Two air-driven winches, anchored to the top of the bridge, proved of great value for lifting materials weighing under one ton from the ground and in building the falsework bents.

Several On-Track Units Used

A railroad-built on-track derrick car, of 40 tons capacity, was used to great advantage both in dismantling the wrecked parts and in the reconstruction of the structure. Also, a 25-ton Diesel-driven clamshell and a 7½-ton crane, both track-mounted units, were employed in lifting out wreckage and in placing caps and bracing on the bents. The crane was also used to unload new bridge materials from cars to the trucks.

In the reconstruction of the deck on the deck-truss span, a panel at a time of the damaged steel was burned away and lifted out, and temporary I-beam stringers and floorbeams were set in place by the derrick car. The temporary floorbeams were made up of two 36-in. I-beams fastened together, side by side, and separated by a timber between the webs, while the stringers were each made of three 24-in. I-beams fastened together. Two such chords were placed in each panel to support the eastbound track over the deck-truss span. Connecting angles and plates were improvised in the field from undistorted parts of steel taken from the damaged spans. In this field framing and assembling, cutting torches and power tools were used for the cutting, shaping, drilling and boring of holes, and for the riveting and bolting work.

A great deal of work was involved in picking up spilled loads and cars below the structures, and for this work a crawler-type dragline, together with a wheel-mounted electric plant and lights, were rented from a local contractor.

At the same time that the bridge-repair work was being done, the track extra gang installed crossovers between the main tracks at each side of the bridge. The cross-over switches located in the westward main track were lined for the turnout, and these switches were equipped with mechanical switch locks. The crossover switches located in the eastward main track were spring switches equipped with mechanical facing-point locks. The spring switch of the west crossover was lined for the westward track while the spring switch of the east crossover was lined for the eastward track.

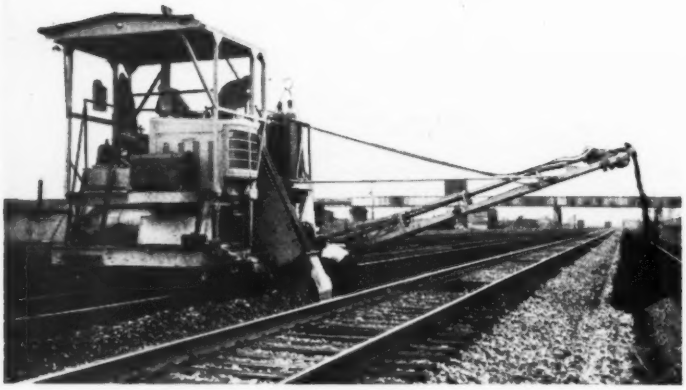
The signal installation consisted of an automatic interlocking system with signals normally set in the stop position, and were cleared automatically by the approach of a train. By the arrangement of the crossovers, no hand operation of switches was necessary for through movement of trains, as a train would trail through one spring switch in each direction. Trains were then operated by signal indication which eliminated the necessity of train orders. Traffic was resumed over this single track on Friday, October 28.

With service thus restored, the construction of the permanent structure for the westbound track was undertaken and, when this was completed, similar work was carried out for the eastbound portion of the structure. The permanent repairs were completed on January 20.

Restoration of the bridge, track and signal work was carried out under the general direction of the bridge engineer and his staff, the engineer of track and chief signal engineer. The improvised use of plates and parts from damaged members, the field sketching and laying out of the connections, rivet holes and bolting were planned in the field.

Equipment Opens Door to B

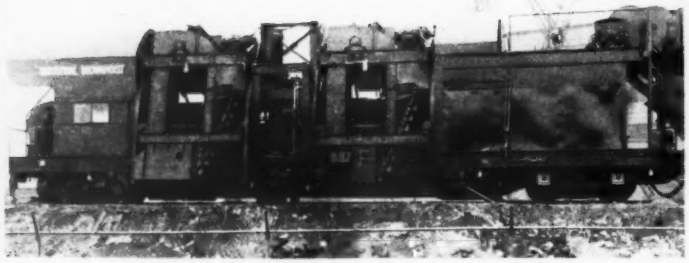
The development of machines has now reached a stage where any kind of ballast reconditioning work can be undertaken economically and to the extent necessary



The Pullman-Standard Ballast Cleaner—Power Ballaster Division, Pullman-Standard Car Manufacturing Company, Chicago. A self-propelled machine designed to clean about 400 ft. of track ballast per hour, on both sides. It may be operated alone or in production-line sequence with two other Pullman-Standard units—the Power Track Cribber and the Power Ballaster

Speno ballast cleaner—Frank Speno Railroad Ballast Cleaning Company, Ithaca, N. Y. A unit available to the railroads on a contract basis. The machine, which is mounted on a special car and is pulled over the track by a locomotive, consists essentally of twin arrangements of scoops, conveyors, vibrating screens, ballast chutes and scrapers, one on each side

The Matisa ballaster cleaner—Matisa Equipment Corp., Chicago. A self-propelled unit which, by means of a continuous excavating chain threaded beneath the track structure, together with a series of conveyors and screens, digs, elevates and screens the ballast, discharging cleaned stone between and underneath the ties and disposing of the waste dirt clear of the track



Brownhoist ballast cleaner—Industrial Brownhoist Corporation, Bay City, Mich. One of the first large production machines to enter the ballast-cleaning field. Some of the original units, with improvements, are still in operation on a large eastern railroad. It consists of two main units, one for excavating and hoisting fouled ballast and the other for screening it

The Ballastmaster—Railway Ballast Engineers, Inc., Milwaukee, Wis. Said to be capable of cleaning a path of ballast 4 ft. wide on both sides of the track simultaneously at a speed of a mile an hour. All operations of the unit are powered by steam turbines, using steam furnished by a locomotive which also supplies the propelling power when traveling and working

Better Track—

Through Ballast Renovation

• The striking advances that have been made in recent years in mechanical equipment for working and cleaning ballast have focused increased attention on ballast renovation as a means of attaining better track and of reducing track-maintenance costs. It has long been recognized, of course, that keeping ballast clean and in a condition to permit free drainage is vitally necessary if excessive expenditures for maintaining track to proper line and surface are to be avoided. It has likewise been known that clean ballast, and the smoother, more stable track resulting, prolongs the life of rail, ties and track fastenings. But so long as ballast cleaning had to be done by forks or fork-and-screen, it was necessarily confined to short stretches or was totally neglected, both because of the arduous nature of the work and the size of the forces and large costs that would have been involved.

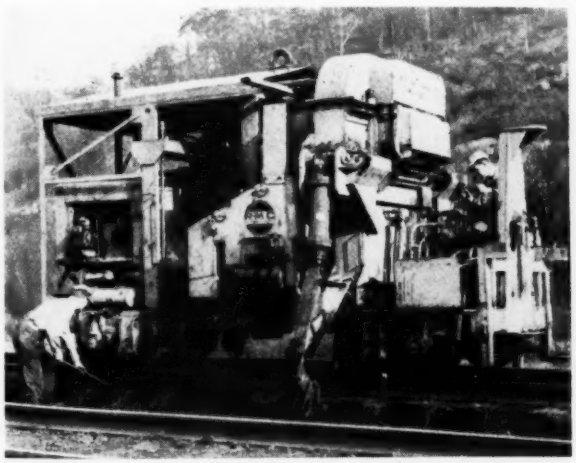
Work Restricted Even in Recent Years

Even in more recent years, with only low-production machines, or a few expensive, large-production machines available—the latter beyond the purse or requirements of most roads, ballast cleaning has continued to be restricted to a point and frequency far below requirements, and on many roads to highway crossings, station platform areas, and other spots where conditions became intolerable.

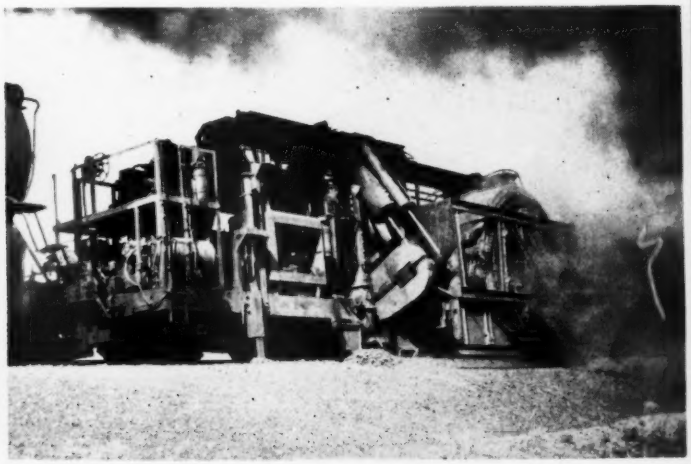
Today, however, the picture is entirely different. The development of new mechanical equipment, particularly since the war, has reached a stage where any

The Ballastex-Screenex—Nordberg Manufacturing Company, Milwaukee, Wis. The Ballastex excavates intertrack or shoulder ballast and feeds it to the Screenex coupled closely behind. The Screenex screens the fouled ballast, wastes the dirt beyond the shoulders and returns the cleaned ballast to the track. The Cribex for crib cleaning may be teamed with these machines

Southern ballast cleaner—An off-track self-propelled machine built by the road for cleaning shoulder ballast. The unit consists essentially of an Athey force-feed loader with screening equipment at the rear. It is operated in conjunction with a bulldozer which windrows the shoulder ballast in advance of the unit. Cleaning rate averaged 3,436 ft. per day last year

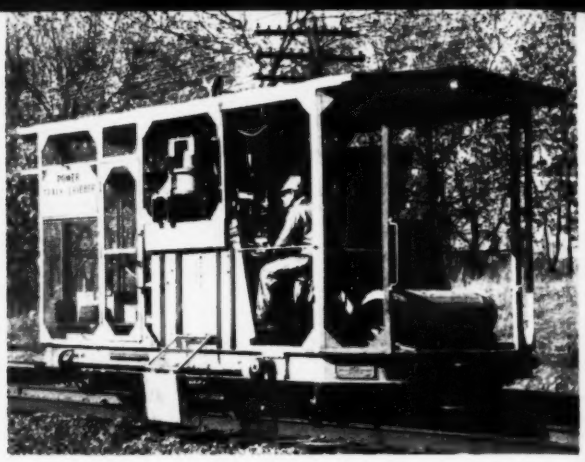


McWilliams crib cleaner—Railway Maintenance Corporation, Pittsburgh, Pa. A self-propelled unit which can be used either for crib excavating and ballast cleaning or, if desired, for crib excavating only. To convert the machine from a ballast cleaner to a crib excavator, it is necessary only to remove the screens. All operations of the unit are controlled by one man



Atchison, Topeka & Santa Fe ballast cleaner—Designed and built by the road. Machine is mounted on a special car and is drawn by a locomotive. The major operations involved in cleaning ballast are performed by and within two large revolving wheels, which incorporate means for picking up the ballast, cleaning it, returning it to track shoulder and wasting dirt

The Mole ballast cleaner—Railway Maintenance Corporation, Pittsburgh, Pa. An off-track self-propelled machine for cleaning either shoulder or intertrack ballast. In operation it digs its own way, screens the fouled ballast, returns the clean stone to the roadbed, and conveys the waste dirt beyond the track shoulder. Maximum digging depth, 24 in. below top of tie

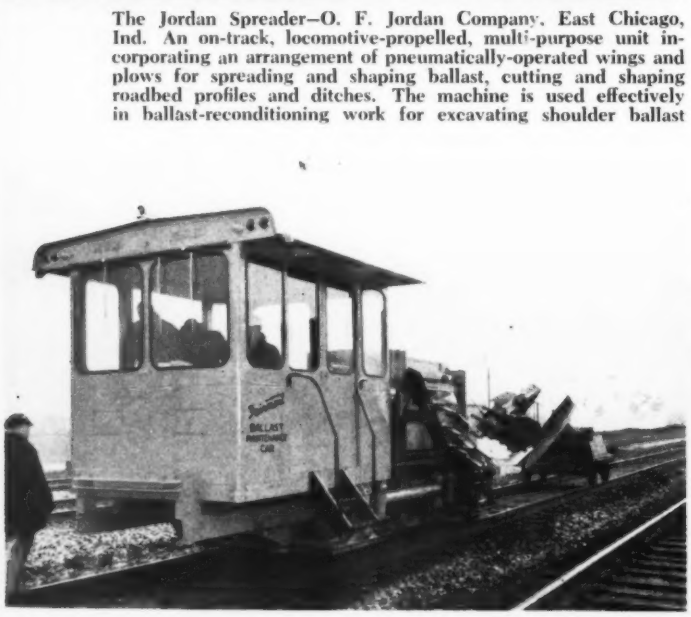


The Power Track Cribber—Power Ballaster Division, Pullman Standard Car Manufacturing Company, Chicago. A skeletonizing machine equipped with drop-head mounted picks which loosen crib ballast, and digger bars which remove the material from the cribs. Crib profiles are automatically sloped for proper drainage. Cribbing rate is approximately two cribs per minute

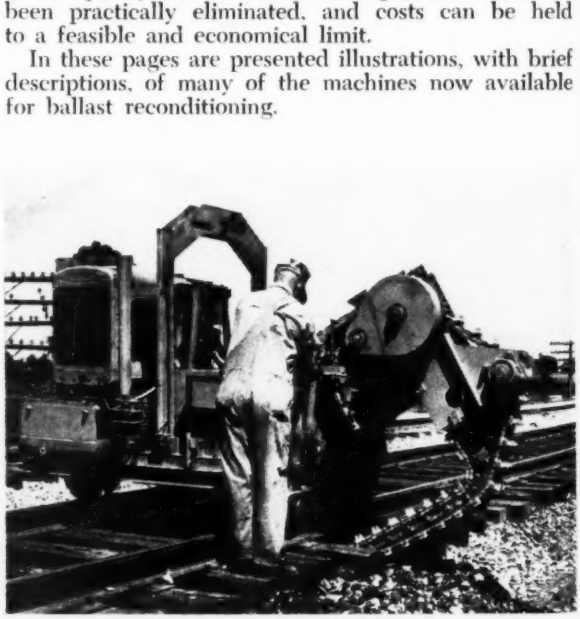
The Jordan Spreader—O. F. Jordan Company, East Chicago, Ind. An on-track, locomotive-propelled, multi-purpose unit incorporating an arrangement of pneumatically-operated wings and plows for spreading and shaping ballast, cutting and shaping roadbed profiles and ditches. The machine is used effectively in ballast-reconditioning work for excavating shoulder ballast

kind of a ballast reconditioning job can be undertaken economically and to the extent necessary. Important improvements have been made in many of the earlier machines, and a number of entirely new units have entered the field—three of them in the last year alone. Today, the maintenance officer has available to him machines that will clean shoulder and intertrack ballast; excavate, or excavate and clean crib ballast; scarify or disc the ballast to retard weed growth and stimulate drainage; or to remove and waste ballast which it is not economical or practical to clean. Furthermore, he has available big-production or moderate-production machines to suit his budget and mileage requirements; on-track or off-track equipment to meet his traffic conditions; and can lease some of the equipment, if he desires, or in some cases can have the work done under contract. Truly, a new era has emerged in ballast cleaning and renovation—a machine era, in which quality work can be done, physical effort has been practically eliminated, and costs can be held to a feasible and economical limit.

In these pages are presented illustrations, with brief descriptions, of many of the machines now available for ballast reconditioning.



The W77 Series A Ballast Maintenance Car—Fairmont Railway Motors, Inc., Fairmont, Minn. An on-track self-propelled unit equipped on each side with scarifiers, disks and blades for breaking up and churning cemented or fouled shoulder or intertrack ballast in order to maintain proper ballast drainage. The car may also be equipped with ballast-shaping boxes



The Cribex—Nordberg Manufacturing Company, Milwaukee, Wis. A machine for excavating crib ballast and depositing the material beyond ends of the ties. It utilizes an endless chain with digging flights moving around a boom which is inserted into the crib from the tie ends. Half a crib is excavated at a time at a production rate of 80 to 130 half cribs per hour

A.R.E.A. Starts Its Second 50 Years

Annual meeting at Chicago, in addition to regular business, will include a number of special features, among them an inspection of new A.A.R. laboratory

F. S. Schwinn
President,
A.R.E.A.

• Reports of its 21 standing committees on a total of approximately 110 subjects will form the principal business to be transacted during the forty-ninth annual convention of the A.R.E.A., to be held at the Palmer House, Chicago, March 14-16. This will be the first meeting of the association's second half-century of existence, the work of the first 50 years having culminated in the Golden Anniversary meeting held just a year ago.

The program of the meeting this year will deviate from customary practice in one important respect—many of the committee reports will be supplemented by one or more addresses on timely subjects related to the work or the general field of activity of the committee. There will be 17 of these addresses, all dealing with subjects of special or unusual interest at the present time, and all presented by men especially qualified.

Another unusual feature of the program this year will be an inspection trip to the $600,000 A.A.R. research laboratory nearing completion at Technology Center (on the campus of the Illinois Institute of Technology) on Chicago's near south side. To allow time for the trip to the laboratory the afternoon session on Tuesday will be adjourned at 4:00 p.m. Those wishing to take part in the inspection will proceed to the LaSalle Street station where they will board a special train on the New York Central, which will leave the station at 4:45 p.m. The party will return on the same train, which will arrive back at the station at 6:30 p.m. There will be a charge of 62 cents for the round-trip train ride. On Tuesday a representative of the railroad will be on hand in the foyer on the fourth floor at the Palmer House to sell identfication tags, which will serve in lieu of train tickets.

Two other events of special interest will take place during the meeting. One will be the presentation during the opening session of an honorary membership in the association to E. M. Hastings, chief engineer, Richmond, Fredericksburg & Potomac. The other will be the annual luncheon on Wednesday, at which the principal speaker will be W. G. Vollmer, president, Texas & Pacific.

Program

49th Annual Meeting

Palmer House, Chicago

Tuesday, March 14

MORNING SESSION—9:45 A.M.

Address by F. S. Schwinn, President
Reports of Secretary and Treasurer
Address by J. H. Aydelott, Vice-President, A.A.R.
Presentation of Honorary Membership to E. M. Hastings
Reports of Committees on
- Water Service and Sanitation
- Highways
- Cooperative Relations with Universities

AFTERNOON SESSION—2:00 P.M.

Reports of Committees on
- Uniform General Contract Forms
- Buildings
- Records and Accounts
- Economics of Railway Location and Operation

(Adjournment at 4:00 p.m. to visit A.A.R. laboratory)

Wednesday, March 15

MORNING SESSION—9:00 A.M.

Reports of Committees on
- Maintenance of Way Work Equipment
- Economics of Railway Labor
- Ties
- Wood Preservation
- Roadway and Ballast

ASSOCIATION LUNCHEON—12:00 NOON

Address by W. G. Vollmer, president, Texas & Pacific

AFTERNOON SESSION—2:30 P.M.

Reports of Committees on
- Yards and Terminals
- Rail
- Track

Thursday, March 16

MORNING SESSION—9:00 A.M.

Reports of Committees on
- Wood Bridges and Trestles
- Clearances
- Waterproofing
- Impact and Bridge Stresses
- Masonry
- Iron and Steel Structures

Closing Business

Today's Big Question—Where to

• There is no question but that the increase in wage rates resulting from the 40-hr. week have spurred maintainence officers to greater efforts in an endeavor to find ways of reducing costs through the use of machines. It is true that the successive increases in wages that had previously been put into effect during and following the war had already brought about a growing appreciation of the value of machines, but the advent of the 40-hr. week seems to have been regarded in the same light as the proverbial straw on the camel's back, because the result has been a sudden and pronounced acceleration of activity in the direction of greater mechanization.

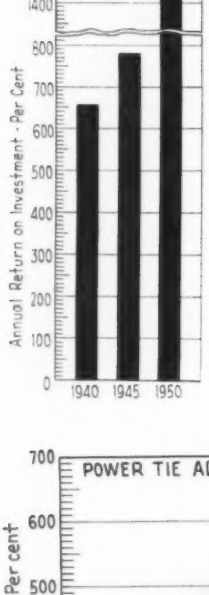
The effects of the 40-hr. week on mechanization have been both general and specific—general in the sense that there is widespread recognition of the greater need of using machines wherever possible to replace manpower; specific in the sense that definite steps are being taken on many roads not only to acquire more machines, but to effect changes in the basic maintenance organization for the purpose of capitalizing more fully on the potentialities of machine power.

To obtain definite information regarding both the general and specific effects of the 40-hr. week a list of questions dealing with various phases of the subject were submitted to the chief maintenance officers of a representative list of roads. Replies were received from 16 companies, mostly moderate in size, representing practically all sections of the country.

Asked if the 40-hr. week had created a need for greater mechanization of maintenance work, all those replying answered in the affirmative, except for one chief engineer. The latter officer, explaining that mechanization on his road was well advanced when the 40-hr. week went into effect, said he did "not consider there is immediate need for additional labor-saving equipment."

Similarly, when questioned if management has become more easily convinced of the value of work equipment since the 40-hr. week went into effect, 13 of those replying answered with the one word "yes". The other three qualified their answers in various ways. One of these, explaining that constant attention had been given for a long time to increasing the output per man-hour through the use of labor-saving equipment, said that the advent of the 40-hr. week did not change the views of management, "except to intensify the need for further study." Another implied that, while management had long recognized the value of machines it had not been able to solve the problem of financing them until the 40-hr. week had made mechanization "practically a necessity." The third indicated that management had always permitted the purchase of equipment to the extent possible with available funds, and presumably would continue to do so.

One line of questioning was desired to develop information re-



Investment Value Going Up

One of the measures of the value of a machine is the saving it brings in the cost of doing work, expressed as a percentage of the initial cost of the unit. The charts on this page, based on man-hour savings as developed by careful studies on a large road, show what has happened to the annual returns on the investment in different machines as a result of increasing hourly wage rates. In making the computations consideration was given to the fact that machines are used a smaller percentage of the time under the five-day week. Changes in the initial cost of the different machines were also taken into consideration. An interesting fact in this connection is that, due to changes in design or to improved manufacturing technique, some machines actually cost less now than in 1940.

e to in Mechanization?

The imposition of the shorter work-week for maintenance of way-and-structures employees, following a succession of wage-rate increases in recent years, has caused many railroads to re-examine their policies and practices regarding the use and value of power tools and machines. Based on a survey among a representative group of roads, this article attempts to trace the changes in thinking that have taken place and to formulate a basis for charting future trends.

garding changes, actual or contemplated, in the maintenance organization, which would require the purchase of additional machines. The replies revealed that 10, or more than two-thirds, of the roads answering the questionnaire have either made, or are considering making, fundamental changes in their track-maintenance organizations. The step most frequently mentioned was the lengthening of the track sections, 7 of the 10 roads indicating that this change had already been made or was contemplated.

On one of the roads that have lengthened sections, it was explained that the personnel of many sections has been increased and some assistant foremen have been authorized. "With the augmented section crews," said this reply, "mechanization is warranted over and above what we might have recommended for the smaller gangs." However, on most of the other roads where the lengthening of sections has been carried out or is contemplated, the plan is to establish floating maintenance gangs to take over much of the work formerly done by the section crews. In several cases it was indicated that the floating gangs would be motorized. Aside from the lengthening of sections, other contemplated changes in organization include provisions for closer supervision of work gangs and for track patrol schemes that will relieve the section foremen of this duty.

Changes Require More Machines

In every case where fundamental changes in the maintenance organization have been made or are contemplated, it was stated that these changes, in themselves, will require the purchase of additional work equipment. The types of machines most frequently mentioned in this connection included automotive equipment, large on-track tamping machines, conventional tie-tamping outfits, power wrenches, power jacks, power rail saws, crib-cleaning machines, power drills, bulldozers, and power spike drivers.

The next question inquired in what other ways is it planned to extend or intensify the mechanization of the track and bridge and building forces as a result of the 40-hr. week. Some of the replies to this question were general in nature, such as: "Constant study is being made to justify further mechanization", or "no additional mechanization contemplated except as new equipment or devices may become available and prove to be of advantage. "Along with other roads," said one chief engineer, "we are naturally going to be more alert in looking for better and more efficient equipment."

Other replies were more specific. One road said that it planned "to motorize to the fullest extent possible." Another said that it is "directing particular attention at this time to reducing labor required in making tie renewals." A third plans to "increase the use of off-track equipment where possible," to "contract for an extensive ballast-cleaning program," and to make "extensive use of power equipment by the bridge and building forces." The chief engineer of a large road said that he plans to make use "of more trucks for transporting men and materials, more large tamping machines, more ballast regulators and dressers, more mowing machines, and more earth-moving machines."

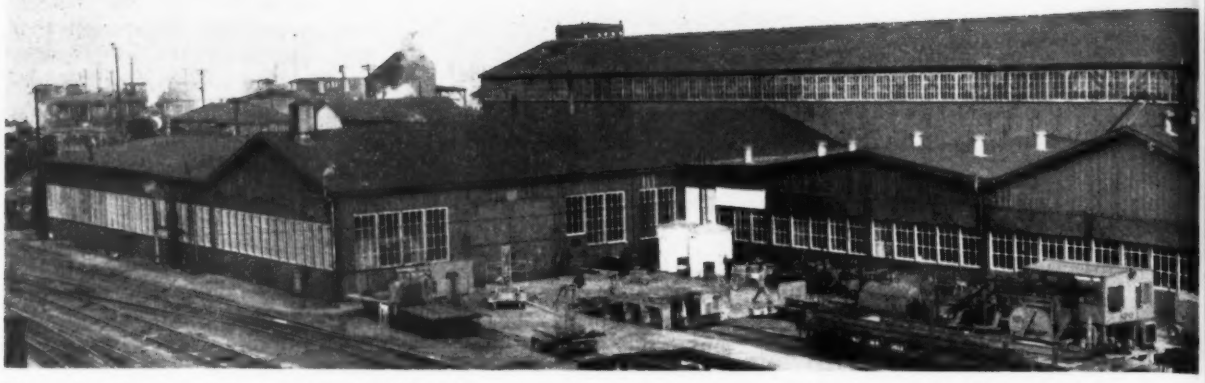
Three other replies to this question stated that further mechanization of the bridge and building forces was contemplated. Some of the tools mentioned in these replies included impact wrenches, hand-held circular saws, chain saws, drills, nut runners, light-duty cranes and automotive equipment.

What Increased Savings?

In general, the replies indicated that not much figuring has been done to show the increased savings that are now possible through the use of work equipment in view of the increased hourly rates incident to the 40-hr. week. The thinking in this connection was pretty well summarized in the words of one chief engineer who replied as follows: "From time to time, as new equipment is developed and brought to our attention, we have analyzed the savings possible and the acquisition of such new equipment has followed the conviction that worthwhile savings could be realized. We will continue that practice irrespective of the advent of the 40-hr. week; but the 40-hr. week does open the field to increased savings due to the higher hourly labor costs."

Another chief engineer, pointing out that the use of machines under the 40-hr. week will produce additional savings of 20 per cent as compared with those realized under the 48-hr. week, added that "as opposed to such savings we will lose 16½ per cent of the efficiency of all work equipment because of its use only five days a week instead of six."

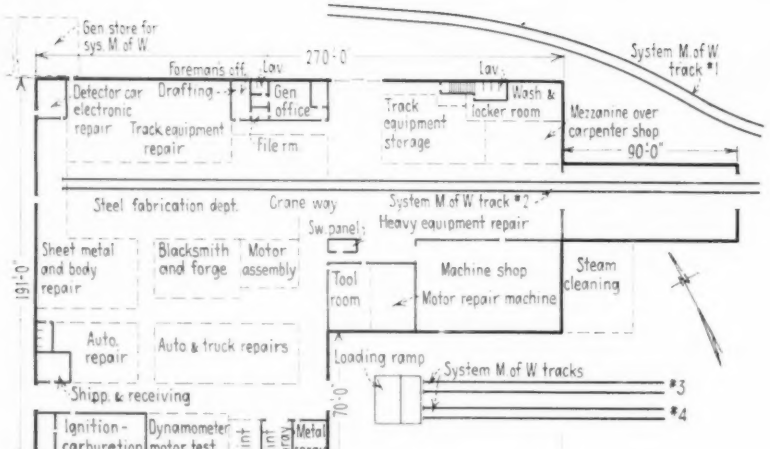
Two of the questions were designed to provide answers that would give a general conception of the progress that must be made before the optimum degree of mechanization is reached. The first of these inquired as to what percentage of the total maintenance-of-way and structures activities are now mechanized. The answers to this question ranged from 20 per cent to 70 per cent, and averaged 46 per cent. The other question asked for estimates as to the percentage of the work that should be mechanzied in the interest of maximum economy. The replies to this question ranged from 50 per cent to 100 per cent and averaged 77 per cent. What this means is that the railroads will have to acquire about two-thirds again as much equipment as they have now in order to achieve the optimum degree of mechanization.



The work equipment repair shop at West Oakland is a revamped backshop, of frame construction, with 42,900 sq. ft. of floor . . .

Southern Pacific Takes Good Care of

By ROY B. CHAPMAN
Supervisor of Work Equipment and Welding, Southern Pacific Company, San Francisco, Cal.



General plan of the Southern Pacific's system work equipment repair shop at West Oakland, Cal., showing the general assignment of space for the various operations

Recognizing the importance of adequately maintaining its growing roster of maintenance-of-way work equipment, including a large fleet of trucks, the Southern Pacific operates a large, well-laid-out system repair shop at West Oakland, Cal. This shop, one of the outstanding features of which is the complement of shop tools and equipment provided to insure high - class, economical work, is described in this article by the man who has direct supervision over all of its extensive operations.

• To maintain the extensive property of the Southern Pacific, which operates over seven western states, traversing several mountain ranges and many miles of desert country where all types of terrain and climatic conditions are encountered, we have a large variety of maintenance-of-way work equipment —and we aim to take good care of it. With the growing mechanization of our maintenance forces, it was found that the ten division shops originally established on our line for motor car repairs could no longer provide all of the necessary maintenance. To insure better control of our repair program, therefore, a system shop was provided and equipped to handle repairs to our heavy equipmnt, formerly done by the mechancial department, and to overhaul and rebuild other machines used by our maintenance forces.

The original system shop was started at West Oakland, Cal., in 1936, in buildings formerly occupied by Southern Pacific ship yard forces. At the end of 1941 this property was taken over by the United States Navy and arrangements were made to rebuild an evacuated back-shop building at this point to carry on our equipment repair work. The building was designed to provide improved facilities and to accommodate a larger working force in order to permit the greatest economy in hauling all types of repairs. West Oakland has many advantages as the site of our shop, since it is at the center, or hub, of the territory served by the Southern Pacific.

The equipment repair organization on the S.P. is charged with the responsibility of maintaining in efficient operating condition practically all units of equipment operated by the maintenance-of-way department, as well as certain types of equipment assigned to other departments. Some of this latter equipment includes all tow tractors, fork lifts, package car-

. . area, track and overhead crane service, and storage platforms

A general view through the high bay, served by the overhead traveling crane, where repairs are made to the heavier types of work equipment

e of Its Equipment

riers, mobile cranes and other units used in stores and station service; also all automobiles and trucks, regardless of the department to which assigned, are kept in good operating condition by the work equipment maintenance department.

To execute this program of maintenance, the division shops were expanded and retooled to handle repairs to motor cars, automotive equipment, stores and station service units, and light-weight units of work equipment. They also provide inspection and field repairs to all units of equipment on their respective divisions. These shops are under the supervision of the division organizations and are governed by the regulations established to carry out the general maintenance plan.

To insure a more reliable service, a program of preventive maintenance was instituted for all automobile equipment, and is conducted in accordance with the accumulated mileage readings on speedometers. The success of this program has influenced its application to many other units of equipment. Full coordination is maintained with the help of three assistant supervisors who schedule machines for overhaul in the system shop at West Oakland.

Large Floor Area

The system shop building is 270 ft. long by 120 ft. wide, with a wing on the south side which is 70 ft. wide by 150 ft. long, making a total floor space of 42,900 sq. ft. A high bay extends through the center of the long section of the building, from east to west, in which is mounted an overhead traveling crane. This crane, with a span of 40 ft., has a main hook with a capacity of 25 tons, and an auxiliary hook of 5-ton capacity. The hooks will clear the floor by 25 ft., which permits the unloading of heavy equipment from freight cars. The craneway extends 90 ft. outside the east end of the building to an adjacent area where all machines are cleaned before being brought into the shop for dismantling.

The volume of shipping to and from the shop necessitates the use of four tracks to serve the shop property. One of these tracks extends the full length of the shop under the craneway and permits bringing into the shop for repairs all types of heavy flanged-wheel-mounted machinery. Platforms for the storage of idle equipment are located both east and west of the shop building, which are served by paved runways for the operation of a 5-ton moble crane.

The building is of wood construction, with board-and-batten outer facing, while the interior walls are lined with wallboard. To take advantage of the natural light from windows in the outer walls, the ceiling and side walls are painted a light color. This lighting is supplemented by a system of artificial lighting so designed as to illuminate adequately the entire area.

The employees entrance to the shop is on the north side, near the center of the long section of the building, and is also used as a truck passageway to the traveling crane. This and all other passageways throughout the building are kept open to permit of the use of the mobile crane, where other crane service is not available. Steam and compressed air are taken from yard distribution lines, which are supplied from a central boiler plant, and the electrical services, consisting of 110-220 volts, 60-cycle, single-phase, and 440-volts three-phase, are transformed from a 4,000-volt, three-phase distribution line. A converter is used to supply direct current for the operation of the overhead traveling crane.

Special attention was given to

The machine shop, a section of which is shown above, is equipped with modern tools

The tool room—a separate enclosure—which is equipped for machine work on engines

Most of the wing section of the shop is used for overhauling automotive equipment

the location of the office for the officers in charge and their clerical help. This is located on the north side facing the center of the shop, and is sub-divided into several rooms, including a room for the general foreman and the department foremen, a large room for the clerical force, rest rooms for the women clerks, and an office for the shop superintendent. All rooms are furnished in accordance with latest practices.

A ten-position teletalk system has been installed in the various departments and offices, including the adjacent stores building, by means of which the office can communicate with any of the departments, or it may be used for intercommunication.

Locker room facilities for the shop employees—in two rooms—are located on a mezzanine floor in the northeast corner of the building, and are reached by means of an inside stairway; an outside stairway is provided as an emergency fire escape. These rooms provide adequate space for steel lockers, tables, benches and wash fountains. Located on the main level, near the foot of the stairs leading to the mezzanine, are two large tables with benches for the use of employees during lunch periods. Toilets are located directly under the mezzanine, and another group is conveniently located in the southwesterly portion of the building.

Work Segregated

The working areas of the shop are sub-divided into separate areas for making repairs to equipment of different types. Each of these areas is provided with the tools required for testing and repairing the particular machines handled.

The easterly half of the area under the crane is used for repairing heavy equipment, such as bulldozers, carryalls, rail cranes, heavy compressors, the gasoline-engine-driven locomotives used in our timber treating plants, and rail detector cars. This area is equipped with a 300-ton horizontal hydraulic press, two 80-ton vertical hydraulic presses, a pedestal grinder, a drill press, a 300-amp. portable electric welding machine, and an oxyacetylene cutting and welding kit.

The westerly half of the area under the crane is devoted to the building and repairing of heavy

equipment accessories and other fabrication work. The equipment provided here consists of seven 300-amp. portable arc-welding machines, eight oxyacetylene cutting and welding kits, a pyramid roll with capacity for handling ¾-in. plate, a rotary shear, a box and pan brake, and a Monograph cutting machine. To protect other employees from the electric arc, canvas-covered, light-weight portable shields are used.

In the northwest corner of the building is a room for testing and adjusting rail detector car equipment. The working space between this point and the office is devoted to the repairs of relatively light machines. Separate areas are set aside here for testing and repairing tie tamping guns and other air tools, and for repairing and rebuilding small air-cooled engines, motor cars, station service equipment, and small air compressors. Special equipment provided in this area includes two air-flow meters for determining the consumption of pneumatic tools and the capacity of compressors, a pedestal grinder and a small drill press. Pneumatic tool hose layouts for tie tamping machines, and cables and accessories for field welding units are also assembled and made ready for shipment in this area.

A carpenter shop is located in the northeast end of the building, and is equipped with a band saw, a table saw, a jointer and a cut-off saw for the construction of tool boxes, shipping crates, stake bodies for trucks, and other woodwork. South of the craneway, in the easterly end of the building, are located the machine shop and tool room.

Machine Shop

The machine shop is equipped with modern tools, including five lathes from 13 to 20-in. swing, a gap-bed lathe of 52 in., a number "five" universal milling machine, a 3½-ft. radial drill, an 18-in. shaper, a bolt and pipe threading machine, surface grinder, flywheel grinder, and a 16-in. by 84-in. crank-shaft grinding machine. All critical parts subject to heavy strains, such as crank shafts and mast brace rods from cranes and shovels, are tested for fractures on a Magnaflux machine in this area.

The tool room is a separate enclosure and is well equipped for engine repairs. It is provided with four boring bars ranging in size from 2 to 9 in., a piston grinder, a line boring tool, a shell boring machine, a special boring machine for crawler tractor cases, a rod aliner, and other types of grinding machines. To relieve the machine shop tools of light work, a 10-in. tool room lathe, a 7-in. shaper, and a small milling machine have been provided.

Within the tool room enclosure special portable tools issued to floor mechanics are accounted for upon withdrawal by means of registered numbers allocated to employees.

From the tool room toward the west end of the building, the area is set aside for the rebuilding of gas and Diesel engines, and the clutches and transmissions used in all types of work equipment and automotive units. Few power tools are required here as all units are machined and fitted in the machine shop.

South of the highbay, towards the wing of the building, is the blacksmith shop. This is equipped with two forges, a late type air-operated 500-lb. hammer, layout blocks, an 18-in. drill press, a band cutoff saw, and a large pedestal grinder.

Complete Automotive Shop

Most of the wing section is used for overhauling and rebuilding automotive equipment. This area has a capacity for 12 trucks without blocking the passageways, and provides sufficient room for dismantling and rebuilding them. An aisle extending through this portion of the wing permits easy access for all types of vehicles.

Grouped along the south wall are a metal spray room, a paint shop, a dynomometer testing rack, an enclosure for making repairs to automotive accessories, and an office for the obtaining of parts. The automotive section is equipped with all types of tools adapted for this type of work, such as body and fender tools, rollaway jacks, transmission removal jacks, air-operated greasing guns, portable floor hoists, wheel dolly, sanders, impact wrenches, and similar tools.

The metal spray room is provided with a 16-in. lathe, with a vacuum attachment, which will handle all sizes of crank shafts up to 92 in. long. Drum and axle shafts from shovels, carryall axles, and other types of equipment are reclaimed here by metal spray.

The paint shop utilizes a spray booth 9 ft. high by 12 ft. wide and 24 ft. long for automobile and truck painting. All water-cooled gasoline and Diesel engines are checked by means of two dynomometers, one of which has a range from 17 to 550 hp., and the other from 17 to 300 hp. The engines are mounted on shop-built adjustable frames which are easily moved to the dynomometer connections. Each engine is run at varying speeds and loads for 8 hr. to complete the test. A large engine exchange service is maintained with the division shops and a copy of the test record is forwarded with each engine.

Engine Repairs

When engines are dismantled, all accessories, including carburators, ignition systems, starters, and generators are delivered to the enclosed area where repairs are made. All friction and brake assemblies, oxyacetylene torches and gages are also reconditioned in this area. Machines are used for testing electrical distributors, generators, starters, magnetos, carburetors and fuel pumps. Battery-charging and testing facilities are also provided to recondition the batteries removed from vehicles brought into the shop.

The parts office is well equipped with cabinets for the filing of pertinent information accumulated on all types of machines and automotive equipment. Two pickup trucks are dispatched from this point to keep the shop supplied with parts from local supply houses.

During the past year 470 major units of equipment were completely rebuilt at the shop, and 480 jobs were performed, mostly on automotive vehicles operating in this territory, which are assigned to other than division work. Supplementing these types of work, special machines are often constructed at the shop for maintenance-of-way jobs.

The shop is operated under the general supervision of E. E. Mayo, chief engineer, and R. W. Putnam, engineer maintenance of way and structures, and his assistant, G. L. Morrison. All operations at the shop are under the direct supervision of the author, and are in direct charge of T. S. Bean, shop superintendent.

PRODUCTS OF MANUFACTURERS

New, improved equipment, materials, devices

(For additional information on any of the products described in these columns, use postcards, page 211)

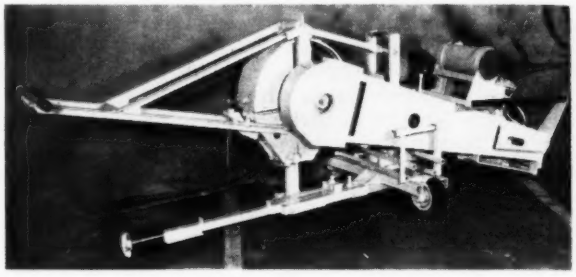
IMPROVED MODEL OF READE TRACK LINER

THE Reade Manufacturing Company, Inc., Jersey City, N. J., has announced that an improved model of the Reade Track Liner is now in production. It is said that this device can be used to shift track horizontally without causing it to "hump", and that its lateral thrust is equivalent to the force imparted by seven men with lining bars. The aligner weighs about 37 lb. and consists of a steel

Lining track with the Reade Track Liner. To release the tool the bar is removed from the socket and the handle is thrown over to engage the trip lever

housing which encloses a thrusting rack, a pawl-and-rack mechanism, and a socket lever. A fin plate extends downward beneath the housing to provide anchorage in the ballast. A foot-trip lever and spring are provided to disengage the mechanism and withdraw the rack. The device is operated by means of a standard lining bar inserted in the socket lever, and provides a throw of as much as 5½ in.

Since the original design of this device, a reduction has been made in the size of the rack teeth to give a more uniform pull and to increase the power, and all working parts have been enclosed to keep out the dirt. The latest improvements are a ½-in. lengthening of the lower lip on the head of the rack so that it will engage the rail base even if used at a joint, and a re-positioning of the trip lever from the side to the top rear of the housing, where it is operated by the operator stepping on the handle.



The Nordberg 1950 Model Spike Hammer

IMPROVED SPIKE HAMMER

THE Nordberg Manufacturing Company, Milwaukee, Wis., has announced its 1950 Model Spike Hammer in which a number of improvements have been incorporated. These improvements include a new hammer oiler with wick feed and ample reservoir capacity which assures better lubrication of the hammer-anvil contact surfaces; a redesigned rotor case which incorporates the anvil guide block as a one-piece weldment, increasing strength and simplifying field maintenance and adjustment; and a redesigned guard that completely encloses the "V"-belt drive.

In addition the truck rollers have been improved to make moving and spotting the machine easier; the frame has been strengthened and the machine made more rugged; and adjustment has been provided in the stabilizer bar so that the driving anvil is always parallel to the vertical axis of the rail, thus assuring that all spikes will be driven parallel to the vertical axis of the rail.

AUTOMATIC COUPLER FOR MOTOR CARS, TRAILERS

THE Rydin Railway Equipment Company, Warrenville, Ill., is introducing an automatic coupler, similar to the standard rolling

A motor car and trailer connected by the Rydin automatic coupler

stock coupler, for use on motor cars and trailers. The coupler is reported to keep such cars always coupled and in true alinement when in operation, even in case of derailment, thus enhancing the safety of the riders. Furthermore, the coupler is said to prevent jackknifing in case of severe impact, and separation of cars due to vibration or chatter while in operation.

The Rydin coupler consists of five parts: a coupler head and shank, a knuckle, a pivot pin and uncoupling lever, a keeper rod, and a stainless steel coil spring. If the uncoupling lever or pivot pin is removed, coupling is still maintained, and the knuckle will remain closed if the spring should fail. The coupler shank, a ⅜-in. by 2½-in. steel bar with a 1 1/16-in. hole, is designed to conform with A.R.E.A. standards for motor car drawbar connections. The automatic coupler can be easily attached to existing equipment in the field.

The coupler is available in two different materials, steel or aluminum. The former weighs 5 lb. and the latter 2 lb. The maximum drawbar pull of the steel unit is 9,000 lb., and of the aluminum unit, 4,000 lb.

In a test carried out last year on a large railroad an aluminum coupler was applied to a motor car and used during the six month working period to tow three to six trailers carrying 60 to 120 men. The coupler performed satisfactorily in this test, withstanding all impacts and showing little wear.

The Pullman-Standard ballast cleaner. Note cleaned ballast being returned to the track at the rear of the machine

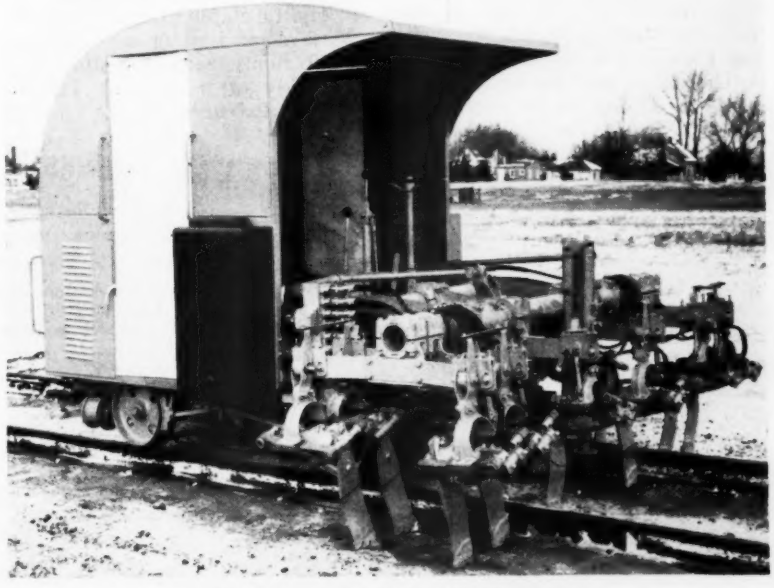
MAKES IMPROVEMENTS IN BALLAST CLEANER

BASED on strenuous road testing last season the Power Ballaster Division of the Pullman-Standard Car Manufacturing Company, Chicago, has made a number of design improvements in its ballast cleaner, and as a result a new improved model capable of cleaning ballast at the rate of as much as 1,000 ft. of track per hour is now going into production. This machine is a self-contained, self-propelled unit which cleans both the crib and the shoulder ballast on both sides of the track simultaneously without fouling adjacent tracks. The greater production will be made possible by design changes in the ballast pick-up and elevator system and in the method of propulsion. A detailed description of the original model of this ballast-cleaning machine was published in the September, 1949 issue, page 886.

JACKSON MULTIPLE TAMPER IMPROVED

THE Electric Tamper & Equipment Co., Ludington, Mich., has announced that the 1950 model of the Jackson Multiple Tamper incorporates a number of important improvements. One of these is a new type of suspension for the individual tampers. The entire assembly is now located above the tamper motor, eliminating the possibility of the adjusting belt coming in contact with the ballast on the downstroke of the tampers, and simplifying belt adjustment and replacement appreciably.

Other improvements include a new hydraulic ram for lifting the tampers, which is of the externally-packed type, and therefore more easily maintained; a hydraulic pump of greater capacity, which increases the lifting speed of the tampers; a more powerful engine; larger gas tanks that will hold enough fuel for a full day's operation; a special, heavy-duty industrial-type transmission; and a new cab. The cab is equipped with curtains for protection against inclement weather and is



The 1950 Model Jackson Multiple Tamper

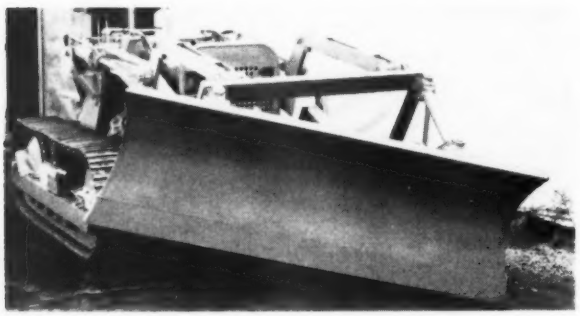
For additional information on any of the products described on these pages, use postcards, page 211.

so designed that, in good weather if desired, the entire top half of the cab can be removed.

ANGLEDOZER FOR A-C TRACTO-SHOVEL

THE Allis-Chalmers Manufacturing Company, Milwaukee, Wis., has announced that a new accessory — the Tractomotive Model TS-5 Angledozer — is now available for application to its HD-5G Tracto-Shovel. The angledozer is attached to the dump cylinder of the machine in such a way that the operator, by working the dump cylinder control lever, is able to tilt the leading corner of the blade to a position 30 in. lower than the trailing corner or heel. This feature permits use of the unit for cutting ditches or shaping ground to a slope.

The dozer can also be set at an angle of 65 deg. to the right or to the left, or it can be used as a straight blade. It is readily interchangeable with the bucket of the machine, and the change, it is said, can be made in a few minutes.

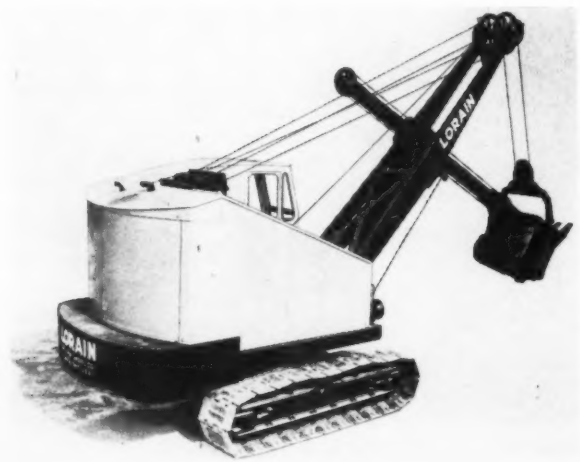


The Allis-Chalmers HD-5G Tracto-Shovel equipped with a Tractomotive Model TS-5 Angledozer

NEW SHOVEL-CRANE IN ¾-YARD CLASS

THE Thew Shovel Company, Lorain, Ohio, is introducing a new shovel-crane in the ¾-yd. class, called the Lorain TL-25. The unit is available in a number of different types of mountings, including a standard, two-speed crawler; an extra-long crawler, for dragline, clamshell and crane work, which increases the ground bearing area of the machine about 25 per cent; a wide-gage crawler; and an extensive series of rubber-tired carriages. The latter include two-engine moto-cranes and single-engine self-propelled carriers.

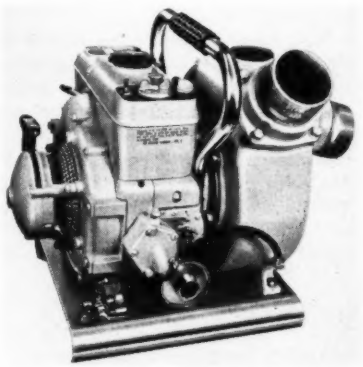
The turntable of the Lorain TL-25 is comprised of several major components, each consisting of an assembly of parts built, installed and replaceable as an integral unit. Other features of the machine include electric starter and operating lights; five identical clutches to control all machine operations, a one-piece all-welded turntable bed; hook rollers mounted on drop-forged brackets with centralized pressure lubrication; machine-cut internal ring gear; oil-enclosed machine-cut gears throughout (except for two intermittently-used gears); anti-friction bearings on all horizontal power shafting and clutch friction drums; and power load lowering. The machine may be equipped for shovel, crane, dragline, clamshell or hoe operations.



A crawler-mounted Lorain TL-25 with shovel boom

PORTABLE PUMP WITH HIGH OUTPUT

THE McCulloch Motors Corporation, Los Angeles, Cal., is now producing a new self-priming pump which is said to be light enough to carry and compact enough to stow in a corner of an auto trunk, yet delivers an output of 15,000 gal. an hr. The unit, called the McCulloch Portable Pump, is powered by a two-cycle, 5-hp. gasoline engine.



The McCulloch Portable Pump weighs only 57 lb.

Some significant features of the engine are a kick-proof automatic-rewind starter, a rainproof ignition system, anti-friction bearings, an automatic governor for controlling its speed at all loads, and controls conveniently grouped in one panel. Lubrication is obtained by adding oil to the fuel. For long periods of operation, a three-way fuel valve is incorporated which permits the use of a separate fuel tank.

The pump is a centrifugal type, made of cast aluminum, and is

said to have a suction lift of 28 ft. There are no bearings within the pump because a non-clogging impeller is mounted on the engine shaft. The pump and engine are set on a spring base to insure footing on all types of ground, and a handle is located at the center of balance to add to its portability.

ROTARY SNOW PLOW FOR ON OR OFF-TRACK USE

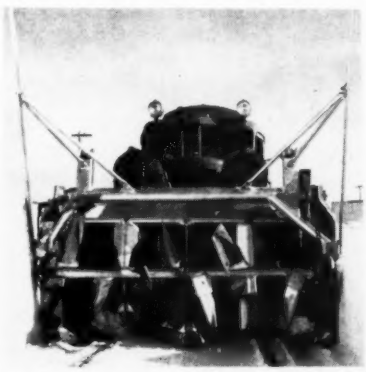
A TRUCK-TYPE rotary snow plow with a special wheel mounting that permits it to be operated on the rails as well as over the highways is now being offered by the Wm. Bros. Boiler & Manufacturing Co., Minneapolis, Minn. The basic unit is this company's truck-mounted "Sno Flyr" rotary plow which has been converted for railroad operation by fitting it with a specially designed mold board and by adding flat-rim steel wheels for operation on the rails and flanged pilot wheels for guiding the unit when it is operating on the track.

There are two sets of the flat-rim wheels and two of the pilot wheels, front and rear. The pilot wheels are hydraulically operated to permit them to be raised into the clear when not in use. To convert the unit for railroad operation it is run onto the track, with the steel wheels in position on the rails, and the pilot wheels are lowered into the operating position. At the same time the pneumatic tires of the unit are deflated to permit the machine to operate through switches and over railroad crossings without difficulty. When it is again desired to reconvert the machine for highway travel the tires are reinflated, using an air compressor that is mounted on the truck for this purpose. Only five minutes is required to deflate or inflate the tires in making the conversion.

A feature of this plow is a revolving telescoping chute which can be used either to cast the snow into the clear or to load it into trucks or cars on adjacent tracks. This permits snow to be cast in any direction except back towards the cab. For operation in yards the loading chute may be replaced by a long-distance casting chute capable of casting the snow a distance of 300 ft.

This plow is capable of operating at a speed of 40 m.p.h. on the track, and it is said that it will pass through drifts 4 to 5 ft. deep at a speed of 6 m.p.h. It is claimed to be effective for operation in drifts up to 12 to 15 ft. in depth. It is powered with a 275-hp. gasoline engine, or may be equipped with a Diesel engine if desired. The standard cab will accommodate three persons, or, if desired, a utility cab large enough for five persons may be had.

This snow plow has recently been subjected to extensive tests in railroad service, and is reported to have given highly satisfactory results. It cuts an opening through the snow about 10 ft. in width, which may then be readily enlarged by a conventional wedge plow. The recommended scheme of operation is to station plows of this type at strategic locations from which they may be readily moved over highways to points of trouble, either to open up snow-blocked lines or to release snow-bound trains.



The truck mounted "Sno-Flyr" rotary plow in railroad service. The plow cuts an opening about 10 ft. wide and may be operated in drifts up to 12 to 15 ft. in depth

I-R CHIPPING HAMMERS

A LINE of chipping hammers based on a new design to meet the cutting conditions imposed by present-day metals has been announced by Ingersoll - Rand Company, New York. Known as the Controlled Power Chipping Hammer line, it includes a selection of 15 power sizes, with 5 basic hammer sizes, to meet job requirements. Each basic hammer size is available in normal-cut, extra cut, or supercut types. This is made possible by a design variation in one part that is interchangeable throughout the whole line.

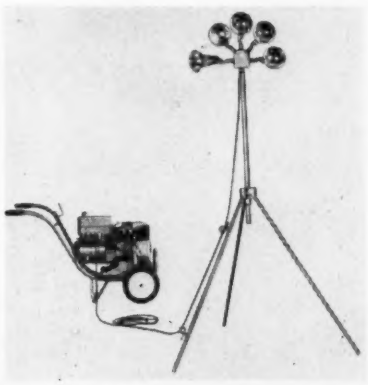
One of the new I-R chipping hammers

A new hard-surfacing process, known as the Iramet process and used exclusively by Ingersoll-Rand, is reported to increase piston life 12.3 times in these chipping hammers. Other important parts of the hammers that are subject to wear are also plated with Iramet. A special valve controls the amount of air fed to the front and rear of the piston and is designed to maintain top cutting efficiency under all conditions.

Other advantages claimed for the new hammers include better weight distribution, more comfortable handles, and a front-end design which allows more chisel "play-off", easing the work and reducing operator fatigue.

ONAN LIGHTING KIT

FOR temporary outdoor night illumination D. W. Onan & Sons, Inc., Minneapolis, Minn., is now manufacturing a portable lighting kit weighing only about 16 lb.



Onan electric lighting kit connected to a portable electric generating plant

For additional information on any of the products described on these pages, use postcards, page 211.

This device features five 150-watt spot or floodlight reflector bulbs, which are mounted on an aluminum frame and tripod that can be quickly adjusted from a height of 3 ft. 10 in. to 6 ft. 2 in. above ground. The five lights are arranged in a semicircle on separate support arms, each of which has two swivels to permit the light to be beamed in any direction.

The reflector bulbs are screwed into socket receptacles with rubber gaskets to prevent water from entering. The bulbs are designed to operate on standard 115-volt alternating or direct current, whichever is specified, and are made of heat-resisting glass suitable for outdoor operation without harm from cold, rain or sleet. A heavy-duty rubber - covered cord, 18 ft. long, and a plug accompany the kit for connecting the outfit to a portable electric generating plant or a commercial power receptacle.

RAISING AND TAMPING DONE BY ONE MACHINE

THE Railway Maintenance Corporation, Pittsburgh, Pa., is introducing a machine for track resurfacing which, operated by only three men, combines in the one unit both track-raising and tie-tamping operations. In resurfacing work this machine lifts a section of track (about half a rail length) to the desired grade, and holds it there while 10 to 12 ties, depending on their spacing, are uniformly air tamped at a rate of from 8 ties to 12 ties per minute. The lifts that can be made with the machine range from 1 in. to 10 in.

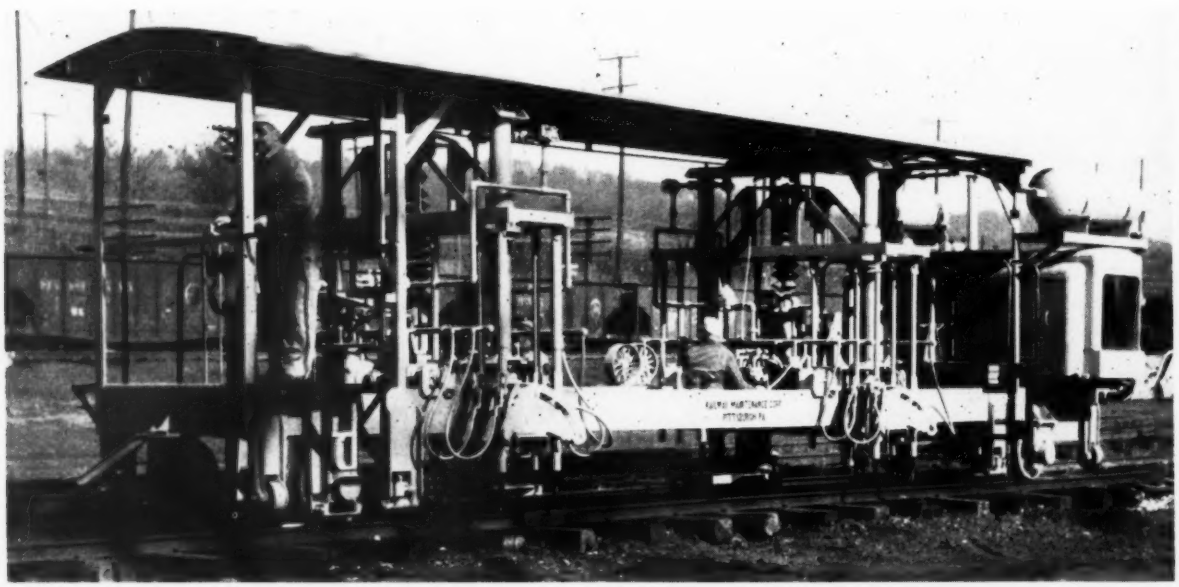
Essentially the machine consists of a self-propelled car with a long, open frame that serves as the track for two carriage-mounted tamping units, each unit equipped with 12 pneumatic tamping tools. The car is equipped with a pair of hydraulic jacks at each end, a Diesel-driven 315-c.f.m. air compressor for operation of the tamping guns, and instruments for sighting the longitudinal grade and cross elevations. One man of the crew controls the spotting of the car and raising of the track, while the other two operate the tamping units, one man for each unit.

In operating the machine, first the jacks on the end of the machine in the direction of travel are spotted in a crib, usually at a joint. Next the track is lifted to the established grade, the amount of raise being determined by sighting through a transit on a high level rod held on the track in advance of the machine. Then while the track is supported by the jacks, the ties spanned by the machine are tamped by the two tamping units working simultaneously but independently. After the ties are tamped the entire machine is moved ahead until its rear wheels rest on the tamped track. The raising operation with the front end of the machine is then repeated.

Since both ends of the machine are equipped with a pair of jacks the machine can be worked in either direction. The jacks in each pair can be operated simultaneously or independently, as necessary. Independent operation makes it possible to establish proper superelevation on curves. All four jacks can be operated together to lift the entire machine when it is necessary to set it off the track.

Each tamping unit is operated by two levers, one for controlling the vertical movement and pressure of the 12 tamping tools, and the other for spotting the carriage over the tie to be tamped. Normally each tamping unit tamps half of the ties spanned by the machine, with arrangement for overlap of the two units if necessary. The arrangement of the air tools in each unit is such that both ends of each tie are tamped from 10 in. inside to 15 in. outside the rail. The tamper mounting is such that the tamping tools follow a predetermined path, reaching under the tie, and includes a resilient mechanism that is said to assure uniform compaction of ballast under the tie.

The machine is 36 ft. long, 9 ft.



This new track-surfacing machine, operated by three men, combines in the one unit both track-raising and tie-tamping operations

6 in. wide and weighs 30,000 lb. It is propelled by an air motor and can travel in either direction at speeds up to 20 m.p.h. The jacks are powered by the compressor engine through a hydraulic pump.

The improved Kershaw ballast regulator and scarifier operating in the reverse direction, plowing ballast from ends of ties

NEW BURRO CRANE

THE Cullen-Friestedt Company, Chicago, has introduced the Model 15A Burro crane, with a capacity of 5½ tons, in which a number of improvements have been incorporated. It has larger clutches than its predecessor, the Model 15, and an improved propelling mechanism. The large clutches are said to provide easier, smoother hoisting, swinging and traveling. The Model 15A is available with either a gasoline or Diesel engine. Also available are such crane accessories as clamshell buckets, magnets, tongs, etc.

The Cullen-Friestedt Model 15A Burro crane

KERSHAW MACHINE FOR BALLASTING WORK

THE Kershaw Manufacturing Company, Montgomery, Ala., has announced an improved model of its ballast regulator and scarifier, a self-propelled unit designed for regulating and distributing shoulder ballast, shaping ballast sections, dressing track, breaking up cemented shoulder ballast, pulling in and reclaiming ballast that has worked off the shoulder, and plowing ballast away from tie ends to facilitate tie renewals.

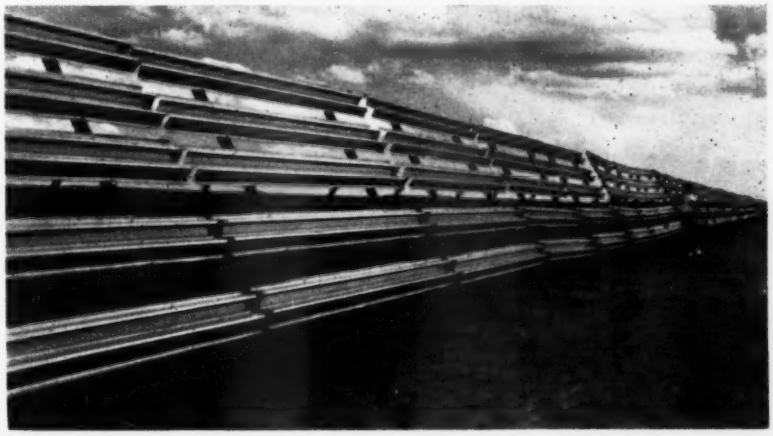
The unit is equipped with hydraulically-operated, pivot-mounted, pocketed wings, one on each side of the machine, which carry excess ballast forward and deposit it in low places, and pull ballast in toward the tie ends, if desired. The front of each wing is equipped with scarifying teeth which, when lowered to the operating position, will reach 4 in. to 6 in. below the bottoms of the ties along the shoulder and tie ends. The rear of each wing is equipped with an extra blade, which, when the machine is operated in the reverse direction, will cut the ballast shoulder to a depth of 6 in. below the ties.

DESIGN CHANGE IN FAIRMONT UNIT

FAIRMONT Railway Motors, Inc., Fairmont, Minn., has announced a change in the design of its new W77 Series A Ballast Maintenance Car. In the original machine, which was described in the February issue of *Railway Engineering and Maintenance*, page 156, the hydraulic pump for operation of the scarifiers, discs and blades was driven by a separate engine. This engine has been eliminated, and the hydraulic pump is now driven by a power take-off from the propelling engine of the machine. A picture of this car is shown in this issue on page 256.

ALL-METAL SNOW FENCE

ARMCO Drainage & Metal Products, Inc., Middletown, Ohio, has developed an all-metal snow fence



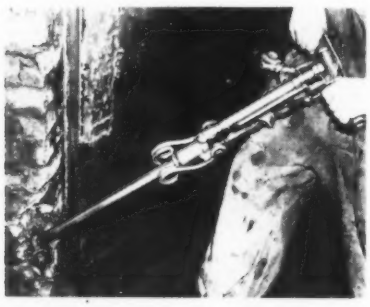
The Armco metal snow fence

For additional information on any of the products described on these pages, use postcards, page 211.

which is fireproof, easy to erect, adequate to resist pressures of wind, snow and livestock, and is expected to have a long service life. The fence is erected in sections, each of which consists of rails 13 ft. 6 in. long bolted in a horizontal postion to two triangular frames spaced 8 ft. apart. The rails are made of No. 26 gage Armco Zincgrip steel, and the frames of Armco Zincgrip channels and angle. The frames are so constructed that the fence sections can be folded flat and stacked, if desired.

NEW AND IMPROVED C-P PNEUMATIC TOOLS

AMONG several new and improved models that have been added to the line of pneumatic



The CP-113 demolition tool, shown here is in the 30-lb. class and is a general utility tool

tools produced by the Chicago Pneumatic Tool Company, New York, are the CP-14 Handril, the CP-59 sinker drill, the CP-365-RP impact wrench, and the CP-113 and the CP-118 demolition tools.

The CP-14 Handril is a new self-rotating rock drill, weighing but 14 lb., for drilling holes from ¼ in. to 1⅝ in. in concrete, tile, brick, marble, granite and other stones. The self-rotating feature permits one-man operation, while its light weight is said to make overhead operation easier.

The CP-59 sinker drill is in the 55-lb. class and is for drilling holes up to 25 ft. It features a new four-in-one backhead for making changeovers quickly to either plain-dry, blower-dry, wet or air-water operation, thus eliminating the necessity for purchasing individual backheads.

The CP-365-RP impact wrench, weighing 32 lb., is equipped with an 8-in. extended shank and is said to be able to drive a screw spike in 6 sec. and to save up to 80 per cent of the time usually required for heavy nut-running work.

The CP-113, demolition tool in the 30-lb. class, is a general utility tool, whereas the CP-118 is in the 70-lb. class and is designed for heavy-duty application. The latter unit can be fitted with a spike-driving front-head attachment for setting cut spikes.

Rubber rail seats, applied between the rail and tie plates, are said to provide uniform, pre-determined deflection

RUBBER PADS FOR TRACK CONSTRUCTION

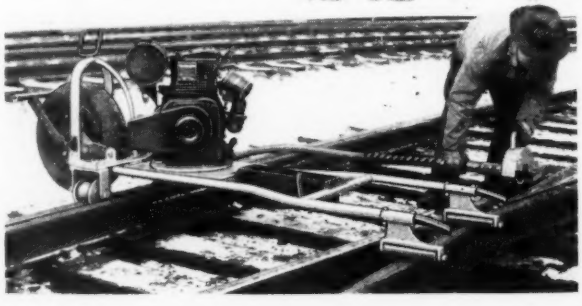
TWO new applications of rubber in track construction—a special tie-plate assembly and as insulation for insulated joints—have been announced by Railroad Rubber Products, Inc., Ashtabula, Ohio. The tie-plate assembly embodies a double-shoulder steel tie plate which is secured to the ties by independent fastenings, and a rubberized pad, called a rubber rail seat, which is inserted between the plate and the rail base. As its name implies, the rubber pad is formed to fit the rail section under which it is used, and has two portions of the upper part which lap over the base flanges of the rail. Holes are provided in both the pad and plate for rail spikes, the heads of which are driven tightly against the pad. Use of these assemblies are said to prolong the service life of the ties, to equalize the loads on the ballast, to pose no seasonal difficulties, to eliminate electrolysis, to have a long service life, and to produce a cushioned, quiet, smooth-riding track.

Molded rubber is used for the end parts, bushings and joint-bar separators of the new insulation material for insulated joints. In addition to supplying insulation and a cushioning effect at the joints, the new rubber insulation is said to seal out dirt, air and water by being made slightly larger than the cavities between the joint bars and rail.

FLEXIBLE-SHAFT GRINDING MACHINE

A PORTABLE flexible - shaft grinding machine, referred to as the Model P-44 grinder, is now being produced by the Railway Track-work Company, Philadelphia, Pa., with improvements that facilitate grinding and handling operations. This grinder is the walk-off wheelbarrow type for one-man operation on heavy-traffic lines where portability on and off the track is especially desirable.

The power unit, a 6-hp. gasoline engine, is swivel mounted for 360-deg. rotation, which is said to eliminate the possibility of short



Dressing a frog point with a Railway Track-work P-44 flexible-shaft grinder

bends or kinking of the flexible shaft while in use. It is equipped with a locking device to prevent the power unit from swiveling during movement of the machine. The flexible shaft driving the grinding head is powered by means of a clutch assembly which acts automatically as an overload release to protect the shaft in emergencies. The mounting of the grinder is adjustable to three up-and-down positions to facilitate the removal of the machine and its replacement on the track, and has ample clearance for moving over switches and road crossings.

EXTINGUISHER CAR AND TRAILER

AN improved fire-extinguisher car and trailer for patrolling the track area following weed burning have been developed by Fairmont Railway Motors, Inc., Fairmont, Minn. These units are said to provide increased water supply, longer service life, and simplified operation and maintenance. A total capacity of 1,600 gal., sufficient for many miles of burner patrol service, is provided by these two units.

The extinguisher car proper, designated as the W73 Series A, has an 800-gal. capacity. A rust-resistant pump is direct driven through a flexible coupling by a single-cylinder, air-cooled engine having an oil-bath air cleaner and an external magneto. Pump lines are made of synthetic rubber to eliminate fatigue. This unit has a structural steel frame, roller bearings, heavy-duty demountable wheels, and four-wheel brakes. Three hose lines are furnished, two of which are ½-in. in diameter and 18 ft. long, with hand valves and spray nozzles on extension tubes, while the third hose is ⅝ in. in diameter and 50 ft. long with a large nozzle and hand valve.

The trailer unit, known as the W74 Series A, is the same as the extinguisher car, except that it is without the pump, engine and hose lines.

The newly improved Fairmont fire - extinguisher car has a greater supply of water for putting out fires

ROTARY SAW ATTACHMENT

A ROTARY SAW is being manufactured by the Gravely Motor Plow and Cultivator Company, Dunbar, W. Va., for attachment to the Gravely tractor. The saw blade can be used horizontally for clearing land of brush, saplings and trees up to 18 in. in diameter, or vertically for cutting fallen timber, the change in positions being made by means of a bolt-secured locking mechanism.

The blade of the Rotary Saw attachment for the Gravely tractor can be used either in a horizontal or vertical position

The saw blade is 26 in. in diameter and is made from Grade A file-temper steel for easy sharpening in the field. The blade is made to rotate by a hand control lever, gears, and a clutch driven by a 5-hp. engine of the tractor. The clutch prevents damage to the saw blade and machine if obstacles are struck or if the blade is pinched.

NORDBERG TIE SWEEPER

THE Nordberg Manufacturing Company, Milwaukee, Wis., has announced that it will soon place on the market a machine for sweeping ties and lowering crib ballast ahead of the adzers in rail-laying operations. The machine has a frame similar to that of the Nordberg adzer and employs a digging chain of the same general construction as that used on the Nordberg Cribex.

The digging chain is designed to remove high ballast from the cribs in such a way as to leave the top of the crib inclined downward toward the tie ends, thus, providing drainage after the rail has been removed. As the digging chain removes the crib ballast a vertically-mounted power-driven broom sweeps the adjacent ties. A feature of the machine is a special digging head which can be swung to permit removal of high ballast between slewed ties.

SAFETY CLAW BAR

A CLAW bar which is said to enable a trackman to pull a spike straight up from a tie without bending it, is now being produced by the Reade Manufacturing Company, Inc., Jersey City, N. J. This tool is called the Reade Safety Claw Bar, the safety features being the protection of the workmen from flying particles of rust, scale, or broken heads while the claw bar is in use, and less danger of back injuries to the trackmen using the tool. Another advantage claimed for the new design is a substantial reduction in the number of damaged spikes.

The new tool is made from a tough alloyed steel and has two sets of jaws, one over the other, which are covered by a protecting shield. The lower jaws are fitted first to the head of the driven spike and, when the spike has been lifted about 2½ in., the tool is withdrawn, then reapplied with the upper jaws used to lift the spike completely out. With this tool, it is claimed that the trackman does not have to bend over

For additional information on any of the products described on these pages, use postcards, page 211.

This spike having been pulled part way with the lower jaws of the Reade Safety Claw Bar, the upper jaws are now being used to finish the pull without bending the spike

as far as with the use of the standard claw bar, and also that it is not necessary to "heel up" the claw bar to obtain a higher lift. A safety marker on the handle indicates to the workman when his hands are in the clear of the opposite rail.

YARD-TYPE RAIL LUBRICATOR

MAINTENANCE Equipment Company, Chicago, is now offering an improved yard-type lubricator, known as the yard-type

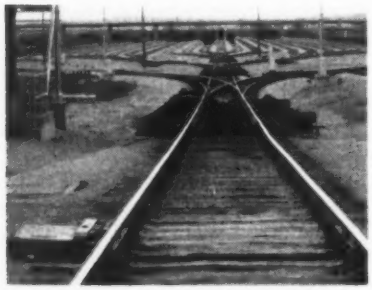
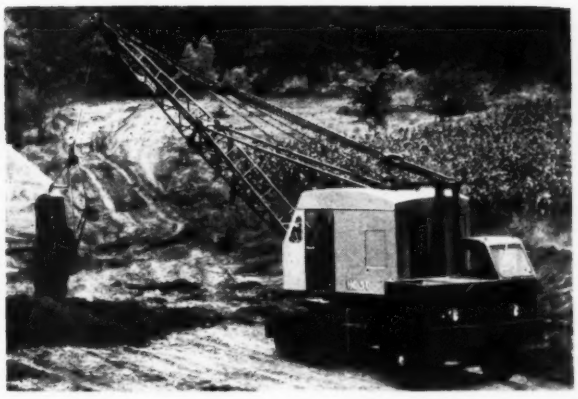


Photo courtesy of A.T.&S.F.

A yard-type two-rail MBJ Meco rail-and-flange lubricator installed one car-length from the hump crest

Model MBJ Meco rail and flange lubricator. As with previous models of the yard-type lubricator the improved unit is for application to leads of ladder tracks or hump-retarder layouts, and can be obtained for application to both rails if the curvature in the yard is in both directions.

The design of the improved model is such that the machine is confined within the limits of ordinary car widths. The general principle of the yard-type MBJ Meco lubricator is the same as that of the standard MBJ Meco lubricator except that the universal shaft assembly has been eliminated and motion is now transmitted from the wheels to the pump-actuating mechanism through two compensating levers. The new machine holds four times the amount of grease as the old yard-type lubricator and the lubricant container is now set so that there is no possibility of snow and water getting into it.



Link-Belt Speeder HC - 51 equipped with a dragline

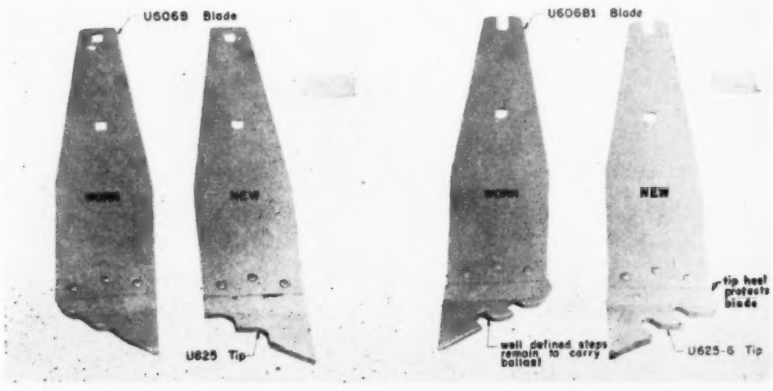
TRUCK CRANE BY LINK-BELT SPEEDER

THE Link-Belt Speeder Corporation, Chicago, is introducing a 12½-ton truck-mounted shovel-crane, with Speed-o-Matic hydraulic controls, known as the HC-51. The truck carrier, equipped with six wheels, has ten speeds forward, two in reverse, and travels over the road at speeds up to 37 m.p.h. Features of the unit include finger-tip control of all crane operations, simplified servicing, and low maintenance costs. The upper machinery can be easily converted for all conventional front-end attachments — shovel, trench hoe, pile driver or crane boom.

IMPROVED BLADE FOR ELECTRIC TAMPERS

THE Electric Tamper & Equipment Co., Ludington, Mich., has incorporated a number of improvements in the tamping blade for its electric tie tampers, including the Multiple Tamper, which have simplified blade replacement and increased tamping efficiency. The new blade is known as U606 B-1.

The former blade, the U606 B, was attached to the tamper motor



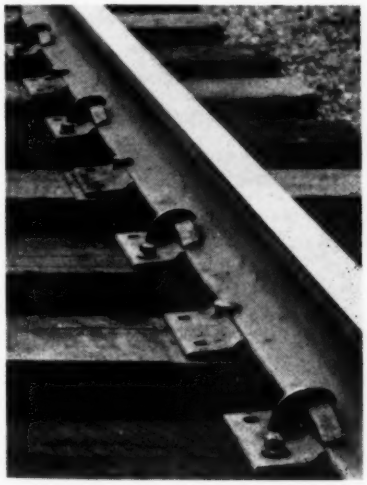
The new U606 B-1 blade (right) has a slot at its top which facilities replacement, and a redesigned step-cut of its tamping tip which increases tamping efficiency

and reinforcing plates by two bolts, one extending through a square hole at the top of the blade and the other through a square hole located lower on the blade. Consequently, it was necessary to remove both bolts and the reinforcing plates to replace the blade. The new blade has a slot at the top, instead of a hole, so that to replace the blade it is now necessary only to remove the lower bolt and slip the blade into place between the reinforcing plates.

Another improvement incorporated in the new blade is a redesign of the contour of the tamping tip. In the former blade the steps cut in the tip often become almost obliterated after a period of wear. The contour of the tamping tip of the new blade is such that well-defined steps are retained even after considerable wear, thus increasing tamping efficiency.

IMPROVEMENTS IN NO-CREEP ANCHOR

G & H RAIL Controls, Inc., Kansas City, Mo., announces that several improvements have been made



Springs of the No-Creep rail anchors are now made thicker, with a smaller central depression, and of finer steel

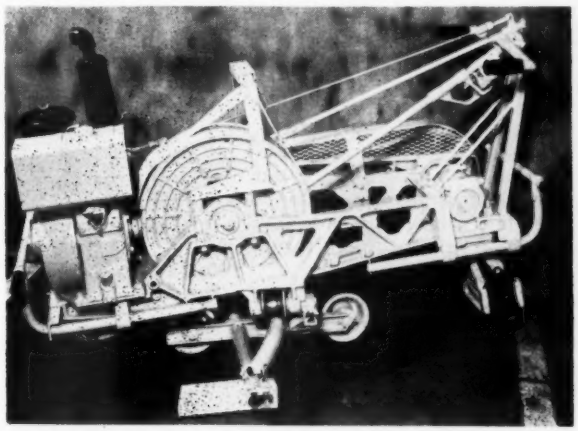
in the design and construction of the No-Creep rail anchor. The more significant improvements were made in the springs used in the assembly, and include a change in the composition and thickness of the steel and in the forged depression in the central part.

The steel now being used for the springs is spring steel, S.A.E. 1095. The thickness of the spring has been increased from ¼ in. to 9/32 in. to combat salt-brine corrosion and coal-dust erosion. The forged depression in the spring has been reduced from ⅛ in. in depth to 1/16 in., as it was found that the smaller depression would keep the springs in place. The new spring is said to deliver approximately double the compressive force as the old spring, or about 4,000 lb. between the base of rail and the tie plate.

IMPROVED NORDBERG POWER WRENCH

THE Nordberg Manufacturing Company, Milwauke, Wis., has announced its 1950 Model "DW" Wrench, in which a number of improvements have been incorporated. These improvements include an engine of about 20 per cent more horsepower, a lifting bail for handling the machine with a crane, redesigned lifting handles for easier manual handling, and a rain shield to protect the friction drive from the weather.

The Nordberg Model "DW" Wrench



BURKART TIE PAD

AS ITS answer to the problem of overcoming the mechanical wear of ties, the F. Burkart Manufacturing Company, St. Louis, Mo., has developed a fibre tie pad, 3/16 in. thick, to be inserted between the tie plates and the ties. These pads have now tested for two years on curved track carrying heavy traffic, and in desert territory and at high altitudes. It is claimed that the pads in these tests, show no signs of deterioration, that the ties on which they were used exhibit no apparent wear, and that there has been a reduction in rail-end wear at the test locations.

An installation of Burkart tie pads

The pad is made up of a carefully-proportioned combination of abaca fibres, entangled and held together by a binder composed of a basic resin of organosol. The natural wiry resilience and high tensile strength of the fibres, coupled with the high density of the binder, compressed to a thin pad, are said to impart characteristics that make the pad immune to oxidation, sunlight, brine, oil, acids, most solvents, alkali, grit, insects, vermin and fungus. Also, it is claimed that the pad does not become brittle in severest cold, does not flow in extremes of climatic heat, and resists moisture.

To apply the tie pad, the track spikes are removed and the rail is jacked up sufficiently to slip the pad under the tie plate. The jacks are released and the spikes re-

For additional information on any of the products described on these pages, use postcards, page 211.

driven through the solid pad, which is said to seal tightly around them. For use with pre-bored ties, the pads can be furnished pre-punched to specifications, with the holes slightly smaller than the spikes to assure a tight seal around them.

RAIL JOINT OILER

A NEW lightweight oil sprayer has been introduced by Fairmont Railway Motors, Inc., Fairmont, Minn., for lubricating rail joints, switches, and track fastenings to prevent corrosion and eliminate frozen joints. The new sprayer, known as the W72 Series A, is an on-track machine that is pushed along the rails, but it has pneumatic set-off wheels for easy removal from the track.

The rail joint oiler consists essentially of a 30-gal. oil storage tank; three small rail wheels, the supports for which combine to form the frame for the unit; a single-cylinder, four-cycle 3.4-hp. gasoline engine; a gear-type oil pump directly driven through a contrifugal clutch; and two 15-ft. long synthetic hoses with hand-valve sprayers. For better coverage and penetration, the oil is heated by means of an adjustable exhaust heater. The oil storage tank is filled by means of a suction line and three-way valve which draw the liquid from drums placed along the track. The machine weighs about 475 lb.

The new pile-driver leads on this Orton combination unit fold automatically when the boom is lowered

FOLDING PENDENT PILE-DRIVER LEADS

ORTON Crane & Shovel Co., Chicago has developed pile-driver leads of the pendent type which automatically fold up when the boom is lowered Leads of this type have been applied to a 40-ton steam-powered combination crane and pile driver built by this company for the Minneapolis, St. Paul & Sault Ste. Marie. Equipped with such leads, this pile driver can get into the clear quickly to permit traffic to pass, or the leads can be quickly removed and the machine used for all types of heavy bridge - derrick erection jobs.

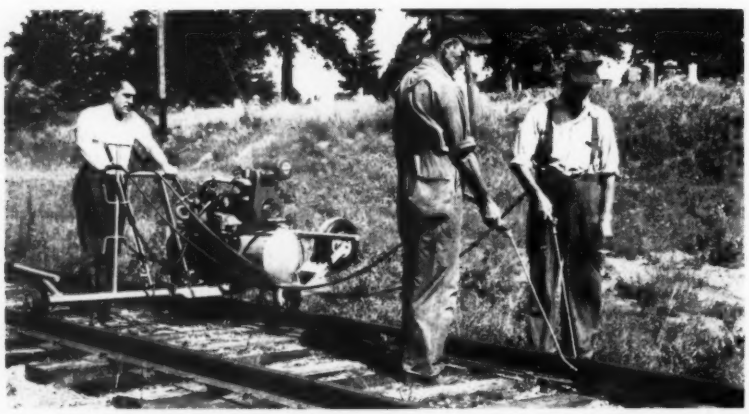
TIE-PLATE LIFTER HAS ELECTROMAGNET

A MAGNETIC hand tool for use in handling tie plates in rail-laying or similar operations is being offered by the Skilling Manufacturing Corporation, Norristown, Pa. This tool is constructed in the form of a T, is 30⅛ in. long, and embodies an electromagnet at the base, powered by a six-volt dry-cell battery in a metal box attached to the stem. Net weight of the tool is 10½ lb.

The electromagnet is energized by closing a trigger-type switch in the handle. When this is done the pull or "lift" of the magnet is said to exceed 95 lb. The battery is described as the Burgess 2F4FL, or equal, and is said to have a service life of 14,000 tie-plate lifts.

Throwing out old tie plates with the Skilling Magnetic Lifter

To use the tool, the operator places it on a tie plate and squeezes the trigger switch. The plate then becomes firmly attached to the base of the tool and may be moved to the desired spot and placed in the exact position on the tie. When removing old plates, the tool and plate may be swung to one side in an arc. Release of the trigger at the proper time causes the plate to be thrown well into the clear. Use of the tool, it is said, will reduce the number of men engaged in handling tie plates on a rail job and will permit plate handling to be done from an erect position, thereby reducing fatigue and the possibility of accident.



With the Fairmont W72 Series A Oil Sprayer, a small crew can spray heated oil on the undersurfaces, as well as the exposed surfaces, of joints

R.H. BOGLE WEED CONTROL CHEMICAL

THE R. H. Bogle Company, Alexandria, Va., is offering a new combination of weed-killing chemicals, which, the company reports, gave highly satisfactory results in research field tests carried out last year in six southeastern states. This combination consists of sodium trichloroacetate (T.C.A.) and sodium chlorate.

In the first series of tests the company applied T.C.A. alone and with other chemicals, and also applied sodium chlorate with other chemicals. Subsequent inspections revealed that T.C.A. was effective on Burmuda grass but largely ineffective on Johnson grass and weeds. On the other hand sodium chlorate, in the amounts applied, was found to be less effective on Bermuda grass than T.C.A., but was far more effective on Johnson grass and weeds. Consequently, the company decided to try a new formula combining T.C.A. and sodium chlorate. This formula, in both early summer and late summer tests, gave promising results.

The company reports that, in the early summer tests, the new combination killed 80 to 90 per cent of Bermuda grass, 80 to 90 per cent of Johnson grass, and 90 to 100 per cent of annual weeds. In the late summer tests the company reports that the chemical killed 80 to 100 per cent of Bermuda grass, 90 to 100 per cent of Johnson grass, and 90 to 100 per cent of annual weeds.

LIMA-HAMILTON RUBBER-TIRED CRANES

THREE new rubber-tired cranes, designated as Types 34-T, 34-M and 604-M, are now being offered by Lima Shovel and Crane Division of Lima-Hamilton Corporation, Lima, Ohio. Type 34-T is mounted on a truck chasis with independent power for crane operation and travel, whereas Types 34-M and 604-M are self-propelled units using the power from one engine, mounted in the rotating assembly, for all operations.

Standard equipment on Type 34-T includes a 5-speed main transmission and a 2-speed auxiliary transmission which facilitates 10 speeds forward and 2 in reverse. On the other two crane types, a 2-speed transmission is standard equipment with a 4-speed transmission available if desired. Type 34-M has service brakes operated by air on all wheels, and steering is accomplished through a hydraulic system. Type 604-M has rigid-type outriggers as standard equipment, and is equipped with oscillating tandem-type rear axles to provide flexibility when working on an uneven terrain. This last type crane has a lifting capacity of 35 tons.

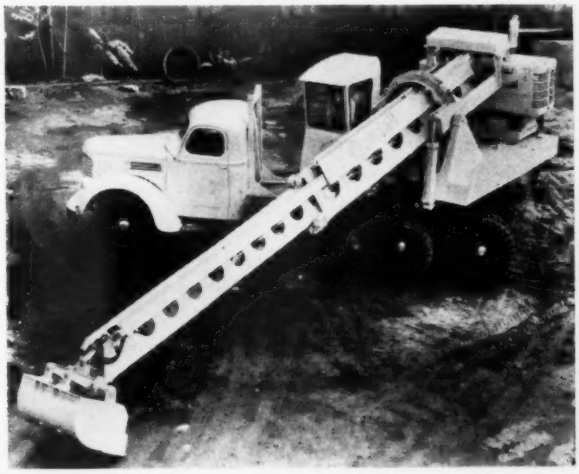
The Lima mobile crane, mounted on a Dart truck chassis, has independent power for travel and crane operations

GRADALL IMPROVED

A NUMBER of improvements, designed to increase efficiency, have been incorporated in the latest model of the Gradall — a multi-purpose earth mover manufactured by the Warner & Swasey Co., Cleveland, Ohio. Furthermore, the Gradall is now being offered with a Diesel power unit if desired.

Greater stability has been provided through a new design of rollers and bearings; greater operator visibility has been attained through redesign of the cab; the lifting capacity of the telescoping boom has been increased through the provision of a 2,000-lb. counterweight; the elevating cylinders have been relocated to provide a straight thrust on the boom, with a minimum of pivoting; and five rollers, instead of three, have been provided for operating the boom extension.

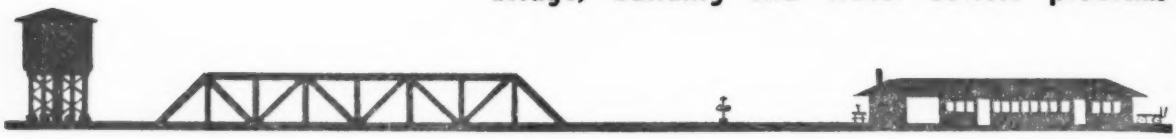
Furthermore, all cylinders have been redesigned for longer life and simplified maintenance; a hinged cover has been provided to facilitate inspection and servicing of valves; and the amount of piping has been substantially reduced. As a result of these improvements the appearance of the machine has been streamlined.



Improved Warner & Swasey Gradall

WHAT'S THE ANSWER?

An open forum for maintenance men on track, bridge, building and water service problems



Intervals Between Bolt Tightenings

At what intervals should track bolts be tightened after rail is laid? Why? What factors are involved?

Tighten Every Six Months

BY GENERAL ROADMASTER

It is my opinion that track bolts should be tightened at six-month intervals, preferably in the spring and fall. If this work is put on a program basis, it is not excessively expensive, and the joints are maintained in a satisfactory condition to eliminate "frozen" bolts, thereby allowing the necessary expansion and contraction that occurs during changes of weather. It is also my opinion that if bolts are kept at the proper tension at all times in the joint assembly, they have a material effect on retarding the mashing, flowing and chipping of rail ends.

The railroad with which I am associated has found by actual field tests that bolts tightened on a six-month basis remain in a satisfactory condition, that very few frozen bolts are found, and that the task of tightening the bolts is negligible, resulting, we believe, in economies not only in maintaining a better joint structure, but also in reducing, in the final analysis, the expenses involved in keeping bolts tight.

Tighten After Two Weeks

BY R. C. WATKINS

Assistant Engineer, Chesapeake & Ohio, Richmond, Va.

The joint is at once the weakest yet the most important member of the entire track structure. Upon its maintenance rests the track strength and its riding quality. It is therefore important to tighten bolts properly.

Bolts on newly laid rail often become loose because of neglect. This should not be permitted. Instead, bolts should be given a second tightening about two weeks after the rail is laid or after the passing of sufficient traffic has removed mill scale, rust or other obstructions from bars and rail so that the joint bars can be seated properly. At this stage the stress on the bolts is so reduced that if they are not tightened all contact surfaces of the joint assembly will wear excessively. As this wear increases, the damaging effect of the impact received by the joint multiples, the rate of wear accelerates, and the joint becomes low. The longer these conditions are permitted to accumulate, the more serious will be the other effects that develop, such as end flow of metal, battered joints, damaged joint ties and ultimately bent rail ends.

Conversely, track bolts can be kept too tight. While it is necessary to keep bolts in proper tension, they should never be "frozen". The rail must be allowed to move between the joint bars as it expands and contracts with temperature changes. This can best be accomplished by the use of a mechanical wrench by which bolt tension can be adjusted as desired. Having been tightened after the rail is laid, the bolts should be kept in proper tension by retightening at regular intervals, or as often as conditions require—usually once a year.

(Please turn to page 278)

Answers to the following questions are solicited from readers. They should be addressed to the What's the Answer editor, *Railway Engineering and Maintenance*, 79 W. Monroe St., Chicago 3, and reach him at least 30 days in advance of the issue in which they are to appear. An honorarium will be given for each published answer on the basis of its substance and length. Answers will appear with or without the name and title of the author, as may be requested. The editor will also welcome any questions which you may wish to have discussed.

To Be Answered In the May Issue

1. What effect, if any, has the increased use of Diesel locomotives had on the incidence of rail damage and failures? Cite reasons therefore and experience in this regard.

2. How has the shorter work-week affected fire prevention methods and practices? In what way are the bridge and building forces involved? Explain.

3. What features of design can be incorporated, and other precautions taken to minimize failures of switch throw rods, particularly in the threaded portion? Explain.

4. When floods wash out embankments to a depth and width sufficient to require a temporary trestle to restore train service, what short-cuts can be adopted in trestle design and erection to speed construction and minimize costs? Explain.

5. How can operators of machines that must work or be set off alongside or between tracks be certain that their equipment will clear trains under all conditions? Explain.

6. What types of pumps are best adapted for handling Diesel fuel oil at storage and servicing points? What special characteristics are desirable in these pumps? What capacities? Explain.

7. What are the best methods of repairing wood, cement, or other types of stair treads that have become worn and hazardous? Explain.

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THE WORLD'S FINEST SPRING WASHER . . . designed for more than bolt retention, but for *equal* and *proper* tension on *all* bolts! Maintains the highest bolt tension over a given period of time. The *highest reactive value* in the entire spring washer field—with *fixed tension* . . . the World's Finest Spring Washer.

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Making Crossing Signs More Visible

To what extent are luminescent or reflective materials adaptable for use on crossing signs, crossing gates, and other roadway structures where a high warning value is desirable? Explain.

Effectiveness Being Studied

By W. H. Stilwell
Signal Engineer, Louisville & Nashville, Louisville, Ky.

It is generally recognized that where adequate night visibility is not provided by crossbuck signs, crossing gates and roadway structures painted with ordinary paint, visibility may be improved by using luminescent or reflective materials as backgrounds for the signs or as surface coverings for the gates or structures. The extent to which these materials are adaptable to such uses depends on various factors, such as the degree of their effectiveness, lasting qualities, methods of application, initial cost of conversion, and the cost of maintenance.

Some materials provide a very wide angle reflection with corresponding diffusion of reflected light, while others provide a more concentrated reflection. Some must be applied in a factory where special equipment and trained personnel are available, while others may be applied in a railroad shop or storeroom. All are relatively new and although various railroads have installed them for test, information as to their durability is very incomplete.

Considering the enormous number of crossing signs, gates and roadway structures in use throughout the country, it is obvious that the immediate reflectorizing of all of them is impractical. Present-day costs for the better quality materials make it seem probable that, initially, their general acceptance may be for use on crossbuck signs at those crossings where the cost of automatically-operated warning devices is not justified.

The A.A.R. Signal section and the A.R.E.A. are cooperating in the observation of test installations to develop specific requirements and specifications. Highway users are entitled to a reasonable measure of uniformity in signs, and to this end the organizations above mentioned will doubtless make recommendations not only as to the types of signs which may be reflectorized by the use of these materials, but will specify color of background, color of letters and other details.

Standardization will also benefit the railroads as well as the manufacturers and will tend to provide an improved product at minimum cost. It is not probable that any radical departure from generally accepted practice will occur, but as these reflective materials are improved and their merits become known, they will be accepted as replacements for painted signs and as alternates for reflector button signs and to designate crossing gates and roadway structures.

Terms Used Are Not Alike

By Edwin I. Oppel
Market Development Division, The New Jersey Zinc Company, New York

Although luminescent and reflective materials may seem to be related, they are actually entirely different in function. Luminescent materials glow in the dark **in the absence of other lights.** They can be considered as emergency lighting aids which function when other regular lighting has failed or is not available. Such luminescent materials have little useful reflective value. If ordinary lights, such as automobile headlights, shine on them, their glow-in-the-dark feature is not apparent. As a matter of fact, ordinary white paint has a better reflective value under automobile headlights than luminescent materials.

There are two general types of luminescent materials: (1) Fluorescent; and (2) phosphorescent. Fluorescent materials are much more specialized in use than phosphoresent materials in that they are always used in conjuction with a source of invisible ultraviolet light which energizes them. Principal applications are in airplane cockpits, decorative murals and billboard advertising. Phosphorescent materials, for which the popular term is "luminous", glow in complete darkness **after** exposure to daylight or ordinary artificial lighting. The chief value of phosphorescent paints and plastics for sign use is as markers in situations where a power failure may occur. For example, exit signs in hotels and public buildings will glow in the dark after all other lights go off. Phosphorescent paints and plastics may be used in railroad yards or enginehouse areas to mark obstructions, provided that extraneous light is normally absent from such locations at night.

Glass Beads Emphasize Signs

By A. E. Keeley
President, Prismo Safety Corporation, Huntingdon, Pa.

This is really a double-barreled question. Luminescent and phosphorescent materials, both of which are activated by either the ultraviolet rays of the sun or black light, have proved of no value at all on outdoor warnings, as it is necessary to have a completely black background without any light for these types of material to function. Reflective material, however, is a different matter, and has demonstrated that it is remarkably well-adapted to all types of warnings where a light is directed upon it.

Reflective materials incorporating the use of minute glass spheres partially imbedded in a pigmented binder have been increasing in use in all types of warnings. With this particular type of reflection, when the lights of a headlamp or a lantern are cast upon the surface, the light is returned directly toward the source and, consequently, the driver of an automobile or the holder of a lantern will see the fully illuminated object before him. The materials are sometimes manufactured in sheet form to be affixed to the backing by means of an adhesive; or, more generally, are used in what we call direct process, that is, the binder or paint is sprayed directly upon the surface to be reflectorized.

Recent developments in equipment to handle both paint and spheres have made it possible to reflectorize any object in place,

(Continued on page 280)

NOW! A SUPERIOR METHOD FOR CONTROLLING RAILWAY WEEDS

—Does away with Expensive Hand "Clean-Ups"!

MODERN WEED CONTROL programs must provide over-all efficiency and long-term economy to justify their adoption. Chemicals used today should do the entire job, for labor can no longer be wasted in hand clean-up operations that follow old-fashioned, temporary spray measures.

To get results where ordinary methods fail, investigate General Chemical "TCA"* Formula 7B Weed Killer. This tested, consumer-approved weed killer can provide immediate results *plus* cumulative improvement . . . *at moderate cost!* Weed control with General Chemical "TCA" Formula 7B will help you:

1 Reduce annual work train service

2 Free labor for other important maintenance jobs

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4 Insure proper roadbed, drainage and good riding qualities

5 Increase safety conditions

6 Reduce frequency of tie renewals and track servicing

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★ Kills Grasses
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even a vertical surface. For this reason, crossing gates or other warning signals that are too large to be removed and reflectorized in the shop can be given a glass bead reflective coat at the crossing site without being removed. And due to the fact that the glass beads reflectorize the background and there is a large mass of reflectorized area facing the motorist or pedestrian with a lantern, the warning is far more emphatic than that obtained by reflector buttons or other media simply outlining the object to be noticed. For that reason, vandalism is not as serious as in the case of reflector buttons or other types of warning, and a large part of the surface has to be destroyed by vandalism before the entire area is of no value.

Not only can crossing gates, crossing signs, and other roadway structures be given a high warning value by means of a reflectorized, glass-bead coating, but other signs and structures within the right-of-way, as well as rolling stock itself, can be successfully reflectorized for safety purposes. Signs, whistle posts and crossing signals along the right-of-way will be illuminated by the headlamp of the engine, and consequently the engineer at night time will be given much greater distance warning of such signs.

The material is not difficult to apply. It comes in the form of kits that will give a definite area of reflective surface, and any good spray painter can obtain excellent results by means of the equipment now available. Its durability is several times that of plain paint, and consequently the slightly higher first cost of including the glass beads in the surface is more than offset by the increased durability of the protective and warning surfaces itself. This type of reflective material is particularly adapted to crossing gates, where the gates themselves will become visible when headlights shine on them, even though the red lamps usually affixed to such gates should happen to go out.

Garages for Highway Trucks

Should special buildings be provided for housing the highway trucks used by the maintenance-of-way forces? What are the desirable features of location and design? Can existing buildings be adapted for this purpose? Explain.

Special Buildings Better

By H. W. Kellogg
Division Engineer, Chesapeake & Ohio, Pere Marquette District, Detroit, Mich.

Many railroads have spent thousands of dollars for the purchase of highway trucks for the use of the maintenance-of-way forces. These trucks should have a service life of at least ten years. To make that service life possible they should be housed for protection from the elements when not in use. Such housing will also protect them from theft of parts or equipment that may be carried in them.

It is impractical to provide portable garages for trucks assigned to extra gangs, bridge and building gangs, paint gangs and other forces that are moved frequently from one location to another. The only alternative is to leave them stand near the camp when not in use.

On the other hand, many forces, such as section crews, waterservice men, and electricians, are located at permanent headquarters to which they return each night, and it is a good practice to provide a shelter in which to house trucks assigned to such men. The long week end, due to the five-day week, strengthens the argument in favor of garage space.

The most desirable type of building for this purpose is one which will also provide headquarters for the storage of tools, etc. Such a building should be at least 24 ft. by 32 ft., with a concrete floor, and can be constructed of either prefabricated steel or cinder blocks.

Careful study should be given to locating such a building so there will be easy access from the highway and room to provide parking space near the building for employees. The building should also be as close to the track and to the depot or telegraph office as possible.

A new, specially designed building is most desirable for the housing of trucks, but owing to the cost of buildings of this type, it is not possible to provide them in all cases; hence other possibilities should be investigated so that garage space can be provided at the least possible expense. In many places where sections have been eliminated, the unused section toolhouse can be moved easily to a new location and, with a few minor alterations, can be converted into a suitable garage. Around many terminals there are buildings that are no longer needed for their original purpose. Instead of dismantling such buildings, they can often be remodeled, at a small expense, to provide garage space for several trucks. Every location, of course, presents different problems, but by studying the situation and planning carefully, many ways can be found to provide garage space cheaply and efficiently.

Standardized Prefabs Good

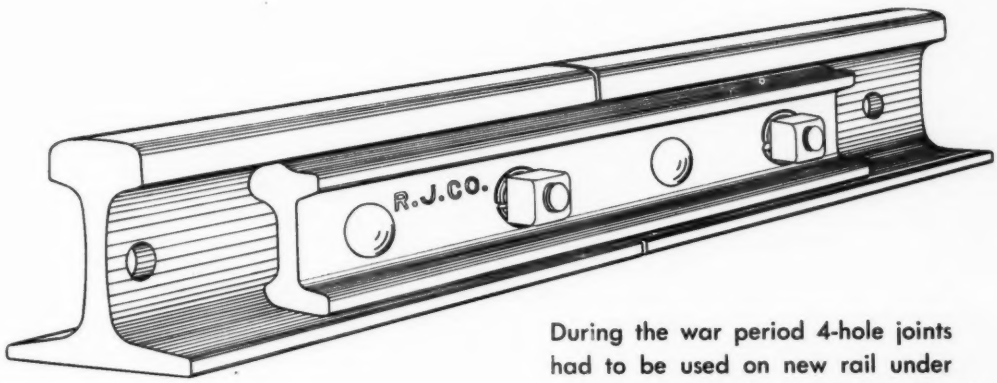
By George S. Crites
Division Engineer (Retired), Baltimore & Ohio, Baltimore, Md.

Highway trucks are assigned to the maintenance-of-way forces to save time and money. To get these savings, trucks must be well housed and well serviced in accessible locations. They should be as ready to go as a fire-engine and to make this possible, truck garages must be suitable and convenient. Where necessary they should be large enough to accommodate an emergency truck or two and leave room for benches, containers, lockers, an inspection pit and other features that allow for the best care at all times.

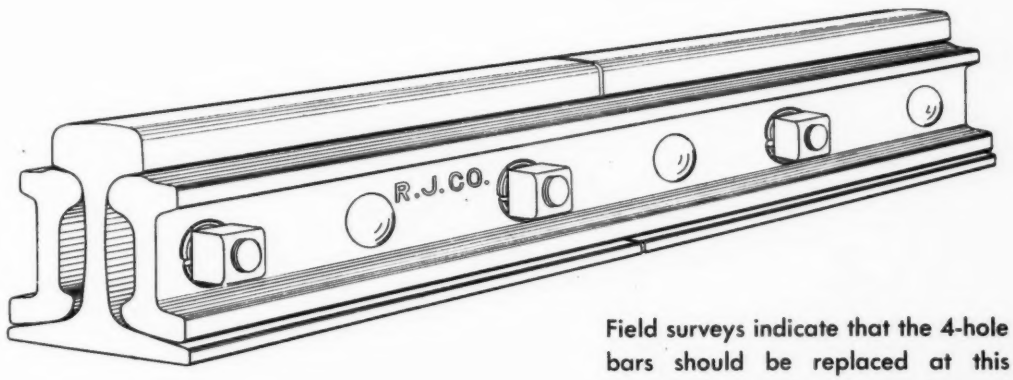
At division points, where several trucks are assigned and more may be added, some suitable, obsolete building, such as a storehouse, enginehouse, or car or machine shop, may be converted into a suitable garage, but the costs of conversion should be carefully figured to make sure that money will not be thrown away in an endeavor to put an old building into use for which it is not suited. A correctly designed and well located new building may prove most economical in the long run. At division points, such garages in all probability will be quite permanent.

(Continued on page 282)

Replace 4-Hole *With* 6-Hole JOINTS *to Prolong Rail Life*



During the war period 4-hole joints had to be used on new rail under Conservation Order M-126 in effect from July 1942-to-May 1945.



Field surveys indicate that the 4-hole bars should be replaced at this time, before rail ends are beyond restoration.

Postponed replacement will prohibit the use of 6-hole joints.

THE RAIL JOINT COMPANY Inc.
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For outlaying places, such as the headquarters for supervisors, signal forces, carpenters, water-service employees, etc., the chances are remote that there will be any old buildings suitable for conversion. For locations, prefabricated buildings designed to accommodate all essentials will generally be the most suitable and economical.

The use of prefabricated buildings of the right size and design for outlying points permits standardization. Should conditions change in a way that makes relocating such headquarters advisable, the garage and its fittings can be moved at minimum expense. It is advisable that, not only the housing itself, but all of its furnishings, be factory-made, to avoid improvised makeshifts that are very costly in the long run.

What Color to Paint Work Equipment

What color should work equipment and roadway machines be painted? Why? Should colors be standardized throughout the industry? Explain.

Colors Should Be Standard

By R. K. Johnson*
Superintendent of Work Equipment & Reclamation, Chesapeake & Ohio, Barboursville, W. Va.

This question infers that there is now no standard color for painting work equipment, whereas the A.R.E.A. adopted medium chrome yellow for motor cars and light work equipment and black for heavy work equipment in 1931. Because considerable confusion arose as to the interpretation of the term "medium chrome yellow", a color chart, illustrating the exact color recommended, was placed in the A.R.E.A. Manual on page 27-8-1.

The detail involved in selecting the color for work equipment and roadway machines is covered in Volume 32 on pages 470-472 inclusive; Volume 43, pages 211-213 inclusive; and Volume 44, page 253, of the A.R.E.A. Proceedings.

The present recommended color—yellow—as shown in the Manual for motor cars, roadway machines and light work equipment, is also used generally for painting highway signs, and is similar in shade to the color used for painting Federal and State highway equipment. This color approximates plate No. 10-L-3 in the Maerz and Paul "Dictionary of Color". It was selected primarily because of its conspicuous visibility against most backgrounds.

The adopted color should be standardized throughout the industry if for no other reason than that it offers the best visibility against most backgrounds and under adverse weather conditions when visibility is normally poor. Yellow is also the commonly accepted color for caution. Furthermore, the adoption of an industry-wide standard color results in certain economies in buying and stocking paint. Prior to 1931, motor cars and work equipment were painted black, gray, red, yellow and green, and a variety of shades in these colors, in view of which it was frequently necessary to pay a premium to the manufacturer for the color wanted or entail the expense of repainting the equipment upon receipt.

*Chairman of A.R.E.A. Committee 27—Maintenance of Way Work Equipment

Yellow Is Most Visible

By Edgar Bennett
Chief Engineer, M.W. & S., Southern, Charlotte, N. C.

In selecting colors most suitable for painting maintenance-of-way work equipment used by the various railroads on and along their operated tracks, the members of A.R.E.A. Committee 27 felt that the color chosen must be such that it could be better seen for the greatest distances under varied weather conditions, and at the same time not conflict with the principal operating colors, green and red. The yellow, as shown by the plate now printed in the Manual, meets these requirements more fully than other colors considered, and at the same time is recognized as a caution color by operating employees.

The yellow color, which has been approved by the Association and printed in its Manual as recommended practice, is generally used by most railroads for its maintenance-of-way work equipment, although there are some modifications of the yellow for distinction between certain departments in maintenance service.

Black for Heavy Equipment

By Edward Burke
Assistant Track Supervisor, Central Railroad of New Jersey, Jersey City, N. J.

Roadway machines and light work equipment that operates on the track, such as push and motor cars, adzers, rail grinders, spike pullers, rail drills, ballasting machines, tie tampers, etc., should be painted a standard yellow, such as is used on highway signs. This yellow color has a long range of visibility and is readily recognized by enginemen as they approach such equipment working on the track.

Light work equipment that operates off track, such as graders, bulldozers, and other earthmoving equipment, should be painted orange. This color does not show soilage readily and still maintains good visibility. Although conspicuous, this color is not quite as bright as yellow, and is also easy on the eye.

The heavy type of work equipment, such as draglines, cranes, etc., is generally protected by a flagman, and should be painted with the longest wearing color—black.

Yellow On Big Machines Too

By Work Equipment Supervisor

Experience over a period of years seems to indicate that Federal-Highway Yellow, as recommended by A.R.E.A. Work Equipment Committee for motor cars, roadway machines, and light work equipment, is about the best color for such railroad equipment.

In my opinion, crane, shovel and spreader cabs should also be painted yellow. Yellow is universally known as a cautionary color, and is used in both highway and railroad signals.

The chassis and running gear of such equipmnt should be painted black because of its tendency to become dirty and the fact that the lower parts of equipment are more subject to damage.

(Please turn to page 284)

Why Is "HERBICIDOL" An Unusually Effective Weed Killer?

THERE ARE MANY REASONS WHY THIS IS THE CASE.

Numerous raw materials are known to have excellent weed killing value. Some have been known for many years, still others have come into use in recent years. The best finished product is the one that incorporates the properties that each one can contribute. Some of these raw materials have to be dissolved in water. Still others are only soluble in oil.
Some finished products may be diluted heavily with water for spraying, others have to be used "AS IS".

PRODUCTION OF "HERBICIDOL" represents some nice chemistry. We can combine both oil and water base raw materials and the final product is water soluble.
Poisonous type weed killer of the old type is known to have powerful weed killing value. But experience has shown that in many cases its use cannot be tolerated because it lures live stock to their death.
Oils of certain types are known to have good weed killing value. Their smothering effect alone is a good contribution. And oils remain in the ground to discourage new germination and growth for many months after they are spread over the right of way. "HERBICIDOL" is applied in water soluble form. But when the water evaporates, the oils revert to their original non-soluble form. The advantage of this is tremendous. One well informed engineer expressed it like this—

> "I have been on this railroad going on twenty-five years. Never within that period have I seen our tracks as clean as they now are after using "HERBICIDOL" for three years. The killing is good. However, it is the inspection of weed conditions a year after the application that impresses me to a point where I know that I now have the answer to the problem of keeping weeds under control."

PERHAPS WE CAN BE OF SERVICE TO YOU IN SETTING UP A WEED CONTROL PROGRAM.

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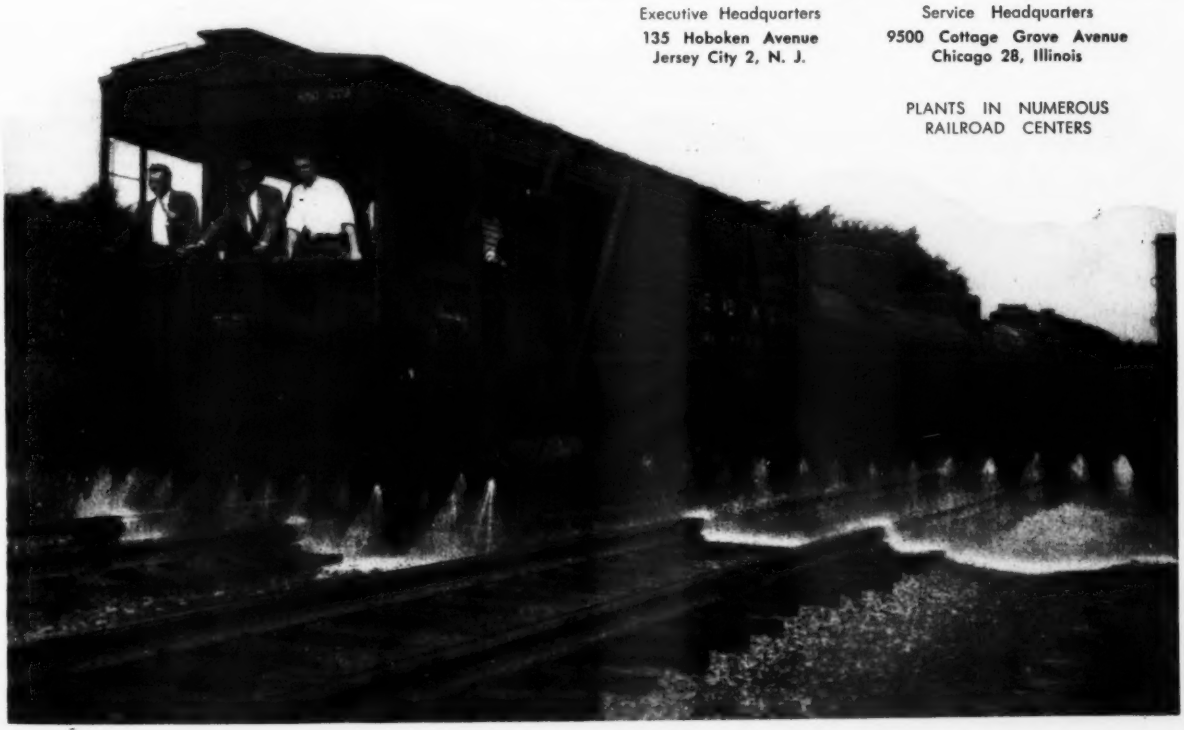
PLANTS IN NUMEROUS RAILROAD CENTERS



Placing Water Barrels on Bridges

To what extent is the practice of maintaining water barrels on bridges and trestles justified by the degree of fire protection afforded? Would sand be as effective as water for controlling incipient fires in these structures? Is it practicable to keep buckets available at such water barrels? If so, how can it be done?

Barrels Are Doubtful Assets

By F. L. Wilson

Roadmaster, Missouri - Kansas - Texas, DeLeon, Tex.

I have always felt that maintaining water barrels at bridges costs more than they have been worth. Barrels placed on bridges are soon punctured by hunters shooting through them or by playful boys knocking them full of holes. Barrels that are buried at the ends of bridges soon rot or rust out and have to be renewed often. In 40 years of track and bridge maintenance I have never witnessed one instance where water taken from a barrel has been used to put out a fire at a bridge. Inasmuch as a fire that has much headway could not be handled with water from a barrel, I would recommend using sand. A small fire can be extinguished with wet sand as easily as with water. The theft of buckets cannot be prevented without punching a few holes in them so they are worthless for anything but a fire bucket. Sand can be handled with almost any kind of a container.

Effective for Small Fires

By B. J. Ornburn

Engineer and Superintendent, Bridges and Buildings, Chicago, Milwaukee, St. Paul & Pacific, Chicago

We are maintaining water barrels on open-deck bridges and trestles even though data is lacking to show the number of fires extinguished through their use. The principal sources of fires are hot cinders from ash pans and hot brake shoe slivers. Such fires are almost always confined to a single location on a structure and can be extinguished by a small supply of water if observed in time. Ballasted-deck-type structures are not subject to fires from these sources. Grass and brush fires usually spread rapidly to relatively large areas, and water supply from barrels is seldom adequate, nor can it be used effectively.

We have not used sand for fire protection on bridges and trestles. The difficulty of keeping it dry in most territories, and of spreading it effectively, are unfavorable to its use. There are locations where it is difficult to provide water, and even harder to keep barrels full because of evaporation and leakage. Sand might be the practical solution in such cases.

The problem of maintaining buckets at water barrels is serious. The inclination to steal water buckets can be reduced, but not eliminated, by providing rounded bottom buckets or conical pails, and by painting them bright red with identifying markings.

The activity of hunters in shooting at water barrels is another serious problem. Even though such activity is generally confined to certain locations, policing, alone, will not prevent the vandalism. One remedy is to box-in the barrel, and place sand or gravel between the box and the barrel, and another is to house the barrel with heavy steel plate.

Always Add Calcium Chloride

By E. M. Grime

Engineer Water Service (Retired), Northern Pacific, St. Paul, Minn.

As I know from personal experience, water barrels on bridges are often the means of preventing considerable destruction by fire, especially in hot dry weather when it takes very little to start a fire.

The water barrels that are placed on bridges are usually recepticles in which paint, oil, chemicals or other supplies have been received by the stores department but are not returnable. Consequently, they have practically no cash value. Frequently they are metal drums having substantially no value after the head has been removed.

Calcium chloride should always be added to the solution so that sufficient moisture will be drawn from the atmosphere to keep the barrels full at all times, as well as to reduce freezing in winter. I have seen barrels containing this solution overflowing, even in summer weather when evaporation is normally excessive. Sand, of course, has a good retarding effect for incipient fires, but is not as quickly effective as liquid, especially in cracks or crevices between timbers where water will penetrate most readily. Sand is not very convenient to store, as it must be kept in a dry place, otherwise may freeze in the winter.

It is of course essential to provide water buckets. These may be square wooden boxes with a bail across the open side, made by the bridge and building department, or else they can be metal buckets with convex bottoms, which make them inconvient to use as ordinary pails.

Suit Protection to Needs

By G. W. Benson

Superintendent of Bridges, Central of Georgia, Macon, Ga.

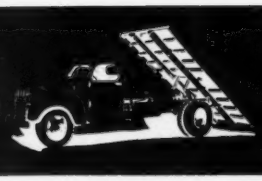
The installation and maintenance of water barrels on bridges and trestles is a considerable expense. The degree of fire protection furnished varies, and each structure should be considered separately rather than attempting to establish a rigid standard. Unquestionably, certain structures will require this type of protection, while at others it is a useless expense. The structures on which water barrels are useless would include those in large cities where city fire departments are available at all times, as well as low, short trestles over never-failing streams. The use of fire-retardant-treated materials and coatings on bridges will permit the revision of fire-protection requirements.

The use of sand in barrels instead of water will be most effective in case of incipient deck fires and will eliminate a lot of maintenance problems, such as evaporation, leakage caused by vandalism, trespassers filling barrels with ballast, and the drinking of water by stock at points where no stock laws exist.

The impracticability of keeping buckets in water barrels is one of the biggest points in favor of sand filling, since anyone can quickly

(Continued on page 286)

A NEW *ANGLE* ON TRACK WORK



ST.PAUL *Dump*IT HOISTS

convert platform trucks into DUMPS; increase work output.

Doing a full week's track work in only 5 days puts a premium on MOBILITY and SPEED. One truck like the unit pictured here can increase the work output of several regular track crews so that a week's work will STILL GET DONE each week. Here's a few hows:

1. Reduce hazardous travel of work crews over main line trackage.
2. Less time spent delivering tools, workers and materials (including work cars) where needed.
3. Workers can be more specialized, because, being more mobile, the specialists can help out regular workers along many miles of track.
4. Addition of a DUMP IT HOIST multiplies the truck's usefulness. Hoist instantly unloads 6 to 7 tons of ties, ballast, timbers, spikes, plates, frogs, etc. Hoist also tips body for manual or winch loading of work car.

St.Paul DS (Drop-Side) body is useful for manual loading. Simple hand lever unlocks or re-locks hinged sides and tailgate. Body may be fitted with folding seats and canvas canopy.

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2. Low mounting for easy loading.
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Recommended installation is a 12 foot DS, platform or cargo body with DUMP IT Pony Hoist on a truck with cab-to-axle dimension of approximately 84 inches. Price, DUMP IT Pony Hoist only with channel steel long-beams and all fittings, ready to install. $365.00, f.o.b. Minneapolis, not mounted.

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St.Paul HYDRAULIC

empty a barrel of sand by using his hat as a bucket. Another advantage of sand is that it will smother a creosote fire, instead of spread it as water has a tendency to do.

Treating Water by "Internal" Method

Under what conditions is the "internal" method of water treatment satisfactory for Diesel locomotives? Explain.

Used For Inhibitors Only

By E. L. E. Zahm
Water Engineer Missouri-Kansas-Texas, Parsons, Kans.

Diesel locomotives require properly conditioned water for: (1) Cooling systems; and (2) for steam generators. Each presents a separate problem. Engine cooling water should be, initially, clear and free from suspended matter, with limitations on hardness and chlorides, and with properly adjusted pH. It is then necessary to treat the water with an inhibitor. This is usually handled by manual application of the required amount of chemical to each engine, and this may be considered an "internal" treatment. The quantity of the inhibitor in the engine is not affected by normal evaporative losses and need not be replenished except if water is actually lost due to leakage or to overfilling of the system. With proper laboratory control, the required concentration of inhibitor may be maintained by manual application at terminals. This method is entirely satisfactory and is in general use.

There are several methods of handling "internal" treatment for Diesel steam generators, **none** of which will dependably proportion the required amount of chemical to the feedwater. The various devices provided on the locomotives to handle such treatment are a source of trouble, and it is practically impossible to feed the correct amount of chemical to the varying quality of the feedwaters that are usually encountered. In addition, such treatment may result in considerable sludge and excessive dissolved solids.

The "external" type treatment with an adequate supply of properly conditioned water for use of road steam locomotives was developed during the past 50 years as most satisfactory. The same reasoning applied to the Diesel water problem. For these reasons, the use of "internal" treatment is not recommended for Diesel steam generators except in emergency, or where the amount of water so treated is very limited.

"Internal" Too Indefinite

By I. C. Brown
Water Engineer, St. Louis-San Francisco, Springfield, Mo.

"Internal" treatment is not a sufficiently definite term, since some chemical reactions occur within the Diesel water systems with or without prior treatment. However, application of compound or other treatments manually is assumed to be the question involved. Such treatment should be limited to emergency use pending installation of adequate treating facilities.

Diesel cooling systems and steam generators should receive water which has had its hardness reduced to a half grain or less by distillation, deionization or Zeolite treatment to prevent the entrance of potential scale or sludge to the systems. This water should receive further treatment before delivery to the Diesels to meet fully the requirements of the cooling systems and steam generators. Equipment for this latter treatment can be installed at a nominal cost in connection with facilities required for rapid servicing.

Manual application of treatment is inaccurate, wasteful, expensive and generally inadequate for the exacting requirements of Diesel locomotives. It compares with the crude attempts to treat water for steam locomotives, when soda ash, etc., were dumped into locomotive tenders. Such practices were generally discontinued years ago because they were considered inadequate.

Water treatment for Diesels is a "must", and plant control and treatment is the only practical answer to the problem since it assures maximum results with a minimum expense for chemicals and supervision.

Corrosion of Buildings' Steelwork

How serious is the problem of corrosion of the steelwork in steel frame buildings, resulting from the walls not being watertight? What precautions can be observed in the design and construction of walls to assure their watertightness? Explain.

Corrosion Can Be Serious

By Walter E. Webb
Resident Engineer, Nickel Plate, Cleveland, Ohio

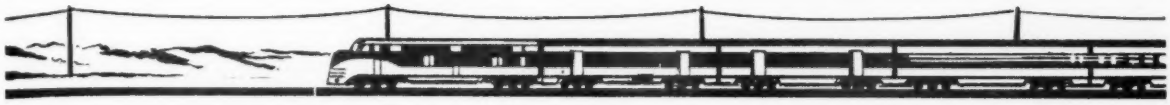
The corrosion of steel framework, resulting from walls which are not water tight, can become serious, particularly if there is a wall fracture sufficient to allow progressive corrosion of a primary member. A break in a masonry wall may allow moisture, and any corrosive agents gathered from the atmosphere, to pass directly to a structural member that is partially, or completely encased in the wall. Cracks provide the course for the capillary movement of water through the wall to the structural members.

Design and construction of walls can eliminate, or materially reduce, these breaks in walls. In design, construction joints should be provided so that cracks caused by temperature changes may be controlled and sealed with plastic materials. Such construction joints should be located at some distance from structural members. Walls should be designed so that a reduction in section will not occur at the location in the wall where the steel structural member is encased.

The use of non-porous materials and mortar or concrete mixes properly designed for density will largely eliminate the weaknesses in walls due to the structural materials.

THE MONTH'S NEWS

Happenings among the railways — the associations — the suppliers



Changes in Railway Personnel

General

Charles L. Schiller, division engineer on the Denver & Rio Grande Western at Grand Junction, Colo., has been appointed assistant to the general manager.

John D. Henley, track supervisor on the Southern at Charlotte, N. C., has been promoted to assistant trainmaster of the Charlotte division, with headquarters at Gainesville, Ga.

David L. Smith, assistant real estate agent of the Atlantic Coast Line, and an engineer by training and experience, has been appointed real estate agent, with headquarters at Wilmington, N. C.

A. Matthews, Jr., transportation assistant to the vice-president of the New York Central, and formerly in the maintenance of way department, has been appointed trainmaster of the St. Lawrence, Ottawa and Adirondack division, with headquarters at Watertown, N. Y.

K. A. Borntrager, manager of freight transportation of the New York Central System at New York, and an engineer by training and experience, has been appointed general manager of the Big Four district, with headquarters at Cincinnati, Ohio, effective March 1.

W. Paul Sullivan, land and tax commissioner on the Chicago, Indianapolis & Louisville, with headquarters at Lafayette, Ind., and formerly chief engineering assistant on that same road, has assumed the duties of purchasing agent in addition to his other responsibilities, with the title of purchasing and tax agent.

L. S. Jeffords, vice-president and general manager of the Atlantic Coast Line, has been elected vice-president-operation, **C. S. Sanderson,** assistant to the president, has been appointed general superintendent of transportation, and **W. H. Kendall,** assistant to general manager, has been appointed assistant to president. All of these men are engineers by training and experience and will have headquarters as before at Wilmington, N. C.

Stuart Shumate, whose appointment as superintendent of the Potomac yard of the Richmond, Fredericksburg & Potomac, at Alexandria, Va., was reported in the February issue, was born on August 22, 1915, at Calverton, Va., and was graduated from Calverton high school and Virginia Polytechnic Institute. Mr. Shumate entered railroad service in June, 1936, with the Pennsylvania, and served in various capacities and locations prior to his appointment as supervisor of track, at Wheeling, W. Va., in 1942. Beginning in 1943, he served with an army railway operating battalion in the Eastern Theatre of Operations until 1946, when he re-entered the service of the Pennsylvania as supervisor of track at Columbus, Ohio. On September 6, 1946, he resigned from the P.R.R. to accept appointment as supervisor of track, Potomac yard, and three months later went to Fredericksburg, Va., in a similar capacity on the main line of the Richmond, Fredericksburg & Potomac, where he remained until his recent appointment.

Engineering

H. Gray Carter, engineer maintenance of way of the Central of Georgia, who has been appointed chief engineer, at

H. Gray Carter

Savannah, Ga., as reported in the February issue was born in Marlin, Tex., on January 24, 1892, and graduated in civil engineering from Alabama Polytechnic Institute. After three years as a surveyor and topographer, he entered the service of the C. of Ga. on September 4, 1916, as a draftsman in the roadway department at Savannah. He was subsequently assigned as assistant engineer at various locations until January 16, 1925, when he was advanced to division engineer, in which capacity he served at Macon and at Columbus. His promotion to engineer maintenance of way came on March 1, 1942.

Geoge A. Belden, whose promotion to assistant chief engineer of the Central of Georgia was announced in the February issue was born in Upper Mont-

George A. Belden

clair, N. J., on August 13, 1888, and graduated in civil engineering from Cornell University in 1912. His first railway service was with the Erie, on which he served from 1907 to 1909 as supervisor's clerk, rodman and foreman. He entered the service of the C. of Ga. in 1912 as a draftsman and was promoted to assistant engineer in 1914. In 1917 he was advanced to architect and was further advanced, in 1937, to engineer bridges and buildings, which position he held at the time of his recent promotion.

E. K. McArthur, roadmaster on the Atlantic & Yadkin, at Greensboro, N. C., has been appointed assistant division engineer of the Southern with the same headquarters.

L. H. Bousfield, land surveyor on the Canadian National, has been appointed engineer of surveys of the Western region, with headquarters at Winnipeg, Man., succeeding **J. H. Murphy,** who has retired.

(Please turn to page 288)

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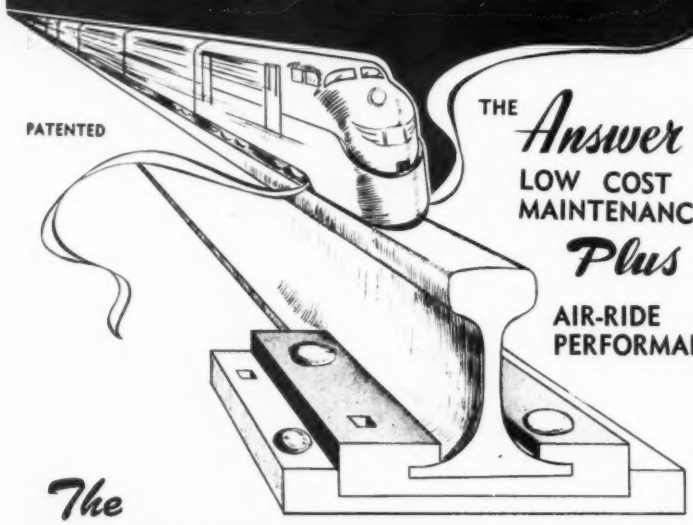

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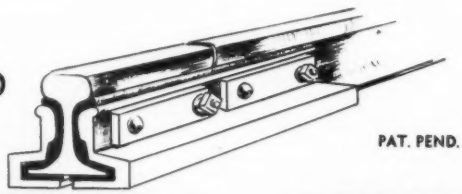

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Railway Personnel (Cont'd)

The headquarters of **C. J. Code,** engineer of tests-maintenance of way of the Pennsylvania, has been transferred from Altoona, Pa., to Philadelphia.

S. W. Shackell, assistant division engineer on the Canadian National, with headquarters at Montreal, Que., recently retired after 18 years of service.

G. F. Metzdorf, assistant chief draftsman for the New York, Chicago & St. Louis, has been advanced to designing engineer, with headquarters as before at Cleveland, Ohio, succeeding **L. E. Horner,** whose death is noted elsewhere in this issue.

R. A. DeVillers, assistant district engineer of the Quebec district of the Canadian National, with headquarters at Quebec, Que., has been appointed division engineer of the Levis division at Levis, Que., succeeding **J. F. Davison,** who has been transferred.

J. M. Trissal, superintendent of communication and electrical engineer of the Illinois Central has been appointed assistant chief engineer, with headquarters as before at Chicago.

J. B. Harvey, supervisor of structures on the Denver & Rio Grande Western at Alamosa, Colo., has been promoted to division engineer, with headquarters at Grand Junction, Colo., succeeding **Charles L. Schiller,** whose appointment as assistant to general manager is noted elsewhere in these columns.

W. L. Seabridge has been appointed assistant division engineer of the Atchison, Topeka & Santa Fe, with headquarters at Fresno, Cal., succeeding **L. E. Smith,** whose death is reported elsewhere in these columns.

H. A. Schnitz, chief inspector in the testing department of the Chicago Rock Island & Pacific, at Chicago, has been advanced to engineer of tests, succeeding **T. D. Sedwick,** whose appointment as manager of the specialties department, National Aluminate Corporation, is announced elsewhere in these columns.

R. D. Culbertson, assistant engineer on the Chicago & North Western at Madison, Wis., has been advanced to division engineer of the Peninsular division, with headquarters at Escanaba, Mich., succeeding **R. D. Ransom,** who has been transferred to the Ashland division, with headquarters at Antigo, Wis. **Mr. Ransom succeeds Otto J. Husemeier,** retired. These changes were effective February 15.

Rush A. Kelso, bridge and building supervisor on the Atlanta division of the Southern, has been promoted to assistant division engineer of that division, with headquarters remaining at Atlanta, Ga., succeeding **Eugene T. Fitzgerald,** whose promotion to division engineer was noted in the February issue. **E. K. McArthur,** roadmaster on the Atlantic & Yadkin (now a part of the Southern), has been appointed assistant division

engineer on the Southern, with headquarters remaining at Greensboro, N. C.

Reginald N. Wade, engineer maintenance of way of the Rapid Transit Lines of the Chicago Transit Authority, has retired.

Lewis W. Moss, whose promotion to division engineer of the Ohio Central division of the New York Central, with headquarters at Columbus, Ohio, was announced in the December issue, was born at Greensburg, Ind., on March 11, 1897. He attended Massachusetts Institute of Technology, from which he received a B.S. degree in June, 1921. He entered railway service on August 15, 1921, as an assistant engineer on the Cleveland, Cincinnati, Chicago & St. Louis (part of the New York Central System), being located at Washington, Ind. Subsequently he served in various capacities and locations on the engineering corps until March, 1941, when he became supervisor of track at Bellefontaine, Ohio. In January, 1942, he was appointed supervisor of bridges and buildings at Mt. Carmel, Ill., and in May, 1943, he became office engineer at Mattoon, Ill. From November, 1943, until March, 1946, Mr. Moss was in the Military Railway Service in the European theatre, from which he was discharged as lieutenant colonel. On being released from the army, he returned to his former position at Mattoon, but was promoted shortly to assistant division engineer of the Western division of the New York Central at Chicago, where he remained until his recent promotion.

W. G. Dyer, district engineer on the Canadian Pacific, at Vancouver, B. C. has been promoted to the new post of assistant engineer maintenance of way, with headquarters at Winnipeg, Man., succeeding **H. W. McLeod,** principal assistant engineer, who has retired. **C. A. Colpitts,** assistant district engineer, succeeds Mr. Dyer as district engineer of the British Columbia district, with headquarters as before at Vancouver, and **K. A. Truman,** division engineer at Medicine Hat, Alta., has been appointed assistant district engineer succeeding Mr. Colpitts. Mr. Truman has been replaced by **William Dunlop,** who has been transferred from Saskatoon, Sask. Mr. Dunlop has in turn been succeeded by **C. M. Thompson,** roadmaster at Wilkie, Sask.

Track

Charles G. Rivers, assistant track supervisor on the Maine Central at Waterville, Me., has been promoted to supervisor at that point, succeeding **William A. Prescott,** who retired on December 31, after 41 years of service.

W. A. Nimmo, has been appointed roadmaster on the Saskatoon division of the Canadian Pacific, with headquarters at Rosetown, Sask., succeeding **G. W. Kostiuk,** who has retired because of ill health.

(Please turn to page 290)

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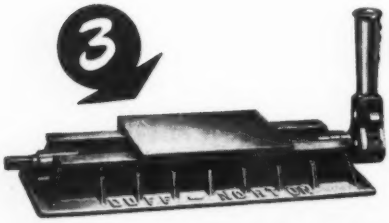

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Railway Personnel (Cont'd)

Cornell Halverson, whose promotion to general roadmaster on the Great Northern, with headquarters at Willmar, Minn., was announced in the January issue, was born on April 10, 1891, at Superior, Wis. Mr. Halverson began his railroad career with the Great

Cornell Halverson

Northern on April 17, 1911, as an extra gang timekeeper, and subsequently served as a general clerk, section foreman, assistant extra gang foreman, and assistant roadmaster until April 15, 1918, when he left the railroad to join the military service. On March 10, 1919 he returned to the G. N. as assistant to roadmaster and extra gang foreman, and on February 7, 1920, he was appointed district roadmaster. Mr. Halverson was appointed division roadmaster on May 15, 1931, with headquarters at Grand Forks, N. D., being transferred to Willmar, Minn., on September 1, 1944, where he served until his recent promotion to general roadmaster.

Peter F. Lambert, supervisor of track on the New York Central at Mt. Carmel Ill., retired recently after 42 years of service.

J. C. Lapointe, roadmaster on the Canadian National, with headquarters at New Carlisle, Que., recently retired after 28 years of service.

G. C. Hodgson, roadmaster on the Canadian Pacific at North Devon, N. B., retired recently after more than 29 years of service.

J. Easby, has been appointed roadmaster on the London division of the Canadian Pacific, with headquarters at Woodstock, Ont., succeeding **W. H. Sproule,** who has been transferred to Guelph, Ont., also on the London division, where he replaces **W. McCrea,** who has retired.

Gerald S. Williams, assistant track supervisor on the Southern at Greensboro, N. C., has been promoted to track supervisor at Greenwood, S. C., succeeding **John T. Hiner,** who has been transferred to Orangeburg, S. C. Mr. Hiner replaces **Robert K. Seals,** who

For additional information, use postcard, pages 211-212

has been transferred to Charleston, S. C. **John H. Hall,** assistant track supervisor at Atlanta, Ga., has been promoted to track supervisor at Cochran, Ga., succeeding **A. Paul Shelton,** who has been transferred to the bridge and building department. **R. Paul Thornburg,** section foreman at McMillan, Tenn., has been promoted to assistant track supervisor at Clinton, Tenn. and **Doyle E. Frisby,** section foreman at Marshall, N. C., has been promoted to track supervisor at John Sevier, Tenn.

J. P. Jones, general foreman on the Reading, at Philadelphia, Pa., has been promoted to supervisor of track at Tamaqua, Pa., succeeding **W. H. Tarman,** who has been transferred to Pottstown, Pa., to replace **C. G. Deppen,** who has resigned to become superintendent for the Toledo (Ohio) district office of the T. F. Scholes Construction Company. **J. A. McCabe,** assistant supervisor of track at West Trenton, N. J., has been appointed general foreman at Philadelphia to succeed Mr. Jones. **Robert G. Bashore,** rodman in the engineering department, has been advanced to assistant supervisor of track in the office of the division engineer at Reading, replacing **K. J. Zitomer,** who has been transferred to Lansdale, Pa., to succeed **E. C. Lawson.** Mr. Lawson, in turn, has been moved to Philadelphia, where he replaces **W. H. Bahrenburg,** who has succeeded Mr. McCabe at West Trenton.

G. J. Yorston, roadmaster at Revelstoke, B.C., has been promoted to supervisor maintenance of way, with headquarters at Winnipeg, succeeding **A. J. Wolfe,** who has retired.

Bert C. Clark, supervisor of track on the Chicago & Eastern Illinois, with headquarters at Watseka, Ill., has retired, effective January 1, after serving in that capacity for 39 years.

D. H. Cushwa, junior engineer on the Eastern division of the Pennsylvania, has been promoted to assistant supervisor of track, with headquarters at Williamsport, Pa., succeeding **H. F. Long,** who has been transferred to Pittsburgh, Pa. Mr. Long succeeds **R. C. Kleffman,** who has resigned.

O. A. Larson, section foreman on the Canadian Pacific, with headquarters at Corinne, Sask., has been promoted to roadmaster at Wilkie, Sask., succeeding **C. M. Thompson,** whose promotion to division engineer is noted elsewhere in these columns.

Albin Thors, assistant roadmaster at Brookmere, B.C., has been promoted to roadmaster at Grand Forks, B.C., succeeding **J. A. Strand,** who has been transferred to Revelstoke, B.C. Mr. Strand succeeds **G. J. Yorston,** whose appointment to supervisor maintenance of way is announced elsewhere in these columns.

(Please turn to page 292)

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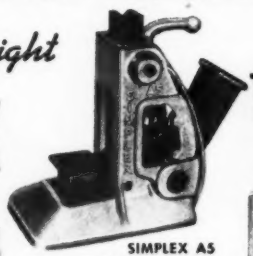

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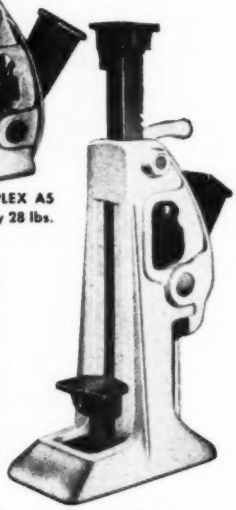

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Railway Personnel (Cont'd)

Bridge and Building

A. Paul Shelton, track supervisor on the Southern at Cochran, Ga., has been appointed bridge and building supervisor at Atlanta, Ga., with jurisdiction over the south end of the Atlanta division, and **James H. Askew, Jr.,** bridge and building supervisor at Asheville, N. C., has been transferred to Atlanta, with jurisdiction over the north end of that division. **F. Vaughn Patrick,** track supervisor at Clinton, Tenn., has been appointed bridge and building supervisor at Knoxville.

Special

P. J. Howe, chief tie inspector for the Alberta district of the Canadian National, with headquarters at Edmonton, Alta., has retired after more than 42 years of service.

C. L. Waterbury, engineer and superintendent fuel and water service of the Chicago, Milwaukee, St. Paul & Pacific, has been appointed supervising engineer, roadway equipment and welding, effective March 1, with headquarters as before at Chicago. The position of engineer and superintendent fuel and water service has been abolished.

Obituary

L. E. Smith, assistant division engineer of the Atchison, Topeka & Santa Fe at Fesno, Cal., died recently.

L. E. Horner, designing engineer of the New York, Chicago & St. Louis at Cleveland, Ohio, died an January 14.

A. L. McCloy, retired supervisor of bridges and buildings on the Pere Marquette District of the Chesapeake & Ohio at Saginaw, Mich., died on December 29.

J. A. L. Madore, retired bridge engineer on the Canadian National, died recently at Montreal, Que.

R. F. Logan, chief engineer, maintenance of way and structures of the Central Lines of the Southern, whose death on December 7 was reported in the February issue, was born at Yadkinvill, N. C., on March 13, 1904, and received his A. B. degree in 1923 and his B. S. in C. E. in 1927 from the University of North Carolina. Mr. Logan entered railroad service with the Southern on November 1, 1925, as student engineer at Danville, Va., and subsequently served as rodman, student apprentice, assistant track supervisor, acting track supervisor, track supervisor, assistant trainmaster and trainmaster at various points. On May 10, 1941, he was promoted to superintendent at Richmond, Va., transferring to Hattiesburg, Miss., on March 15, 1943, and at Atlanta, Ga., on June 1, 1945. Mr. Logan became chief engineer, maintenance of way and structures, of the Southern's Central lines at Knoxville on December 1, 1947.

Association News

Bridge and Building Association

Upon a call by President W. F. Martens, the Executive committee of the association will meet in Chicago at 9:00 a.m. on March 13, at the Chicago Engineers' Club, to review the status of committee work and make preliminary plans for the September convention.

American Railway Engineering Association

The program of the association's forty-ninth annual convention, to be held on March 14-16 at the Palmer House, Chicago, is reproduced on page 257 of this issue. All bulletins containing committee reports are now in the hands of members, and the Yearbook is expected to be mailed out well in advance of the meeting.

Meetings and Conventions

American Railway Bridge and Building Association—Annual meeting, September 18-20, 1950, Hotel Stevens, Chicago. Elise LaChance, Secretary, 431 S. Dearborn Street, Chicago 5.

American Railway Engineering Association—Annual Meeting, March 14-16, 1950, Chicago. W. S. Lacher, Secretary, 59 E. Van Buren street, Chicago 5.

American Wood-Preservers' Association—Annual meeting April 25-27, 1950, Rice Hotel, Houston, Tex. H. L. Dawson, Secretary-treasurer, 839 Seventeenth street, N. W., Washington 6, D. C.

Bridge and Building Supply Men's Association—E. C. Gunther, Secretary, 122 S. Michigan Avenue, Chicago 3.

Maintenance of Way Club of Chicago—Next meeting, March 27, 1950. E. C. Patterson, Secretary-treasurer, Room 1512, 400 W. Madison street, Chicago 6.

Metropolitan Maintenance of Way Club—Walter L. Turner, Jr., Secretary, 30 Church street, New York.

National Railway Appliance Association—R. B. Fisher, Secretary; Lewis Thomas, assistant, Secretary 59 E. Van Buren street, Chicago 5.

Railway Tie Association—Annual meeting, August 28-30, 1950, Brown Hotel, Louisville, Ky., Roy M. Edmonds, Secretary-treasurer, 610 Shell Building, St. Louis 3, Mo.

Roadmasters' and Maintenance of Way Association of America—Annual meeting, September 18-20, 1950, Hotel Stevens, Chicago. Elise LaChance, Secretary, 431 S. Dearborn street, Chicago 5.

Track Supply Association—Lewis Thomas, Secretary, 59 E. Van Buren street, Chicago, 5.

Maintenance of Way Club of Chicago

With another record-breaking attendance, the club met on February 27 and heard J. P. Newell, general manager, Western region, Pennsylvania, speak on Let's Get More Out of Work Equipment. An abstract of Mr. Newell's address, which emphasized the importance of increased productivity through the more intensive, effective and economical use of power tools, roadway machines and work equipment, appears elsewhere in this issue.

The next meeting of the club, to be held at the usual place—Eitel's restaurant in the Field Building, March 27, will be addressed by Harvey C. Marmaduke, representative, Executive department, Illinois Central, who will speak on Super-Vision for Supervision. Mr. Marmaduke's address will be illustrated by 24 visual aids (cards 30 in. by 40 in.) on an easel, illuminated by a spotlight. The business session will be preceded by the usual reception and dinner beginning at 6:00 p.m.

Metropolitan Maintenance of Way Club

An address by H. C. Drake, research consultant, Sperry Rail Service, illustrated by colored lantern slides, was the feature of the meeting of the club held at the Hotel Shelburne, New York, on February 23. Mr. Drake spoke on New Developments in Detecting Rail Defects, in which he described the Ultrasonic Reflectroscope and its application

(Continued on page 294)

Where Bridges and Bananas Are Treated Right

CASE HISTORY
Standard Fruit and Steamship Co.

SINCE 1924 more than 50,000,000 board feet of clean, odorless "Wolmanized" treated wood have been used on the Central American banana farms of the Standard Fruit and Steamship Co. Along its 300-plus miles of tracks, trestles, and bridges the company installs thousands of feet of "Wolmanized" treated ties, piling, and construction lumber every year. To house employees and store its precious banana crop Standard builds homes, office buildings, warehouses, docks, and railroad cars with salt-treated wood. Construction is thereby protected against decay and the 40-odd species of termites in the region.

Service records, the only reliable gage of testing wood preservatives, have been kept on "Wolmanized" treated materials for 25 years. Case histories are available on more than 34,000,000 feet used in the United States and twice that amount in other countries. Write to the address below for your copy.

American Lumber & Treating Co.
1692 McCormick Building . Chicago 4, Illinois

WOLMANIZED PRESSURE TREATED LUMBER

to the non-destructive testing of rail within the joint bar area. An abstract of Mr. Drake's paper appears in the March 4 issue of Railway Age.

Wood-Preservers' Association

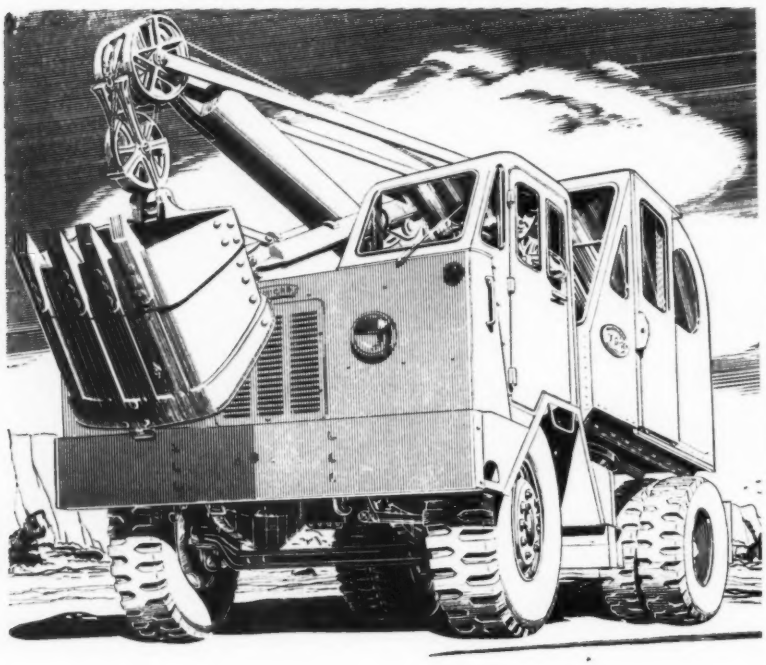
The annual meeting of the association, with a broad and interesting program, will be held at the Rice Hotel, Houston, Tex., on April 25-27. Features of the program of particular interest to timber users on the railways will be the three following papers: Use of Pressure-Treated Ties—Also Creosoted Timber for Open-Deck Packed Chord Trestles, by H. J. McKenzie, chief engineer, Southern Pacific Lines in Texas and Louisiana; Drying Lumber by the Vapor Process, by Monie S. Hudson, research chemist, Taylor-Colquitt Company; and Treated Wood on the Missouri Pacific, by W. J. Burton, assistant to chief engineer, Missouri Pacific. Those desiring further information relative to the convention should address Horace L. Dawson, secretary-treasurer, at the association headquarters — 839 Seventeenth St. N.W., Washington 6, D.C.

Track Supply Association; B. & B. Supply Men's Association

During the past month 20 additional firms have made application for space in the exhibit of these two associations that is to be held at Chicago in September during the concurrent but separate conventions of the Roadmasters Association and the American Railway Bridge and Building Association. As a result, at the time of going to press, a total of 86 firms had applied for 205 booths. Supply companies interested in participating in the exhibit should address their requests for information to Lewis Thomas, director of exhibits, 59 E. Van Buren street, Chicago.

Roadmasters' Association

Taking advantage of the presence of many railway men in Chicago during the week of March 13 in connection with the A.R.E.A. convention, President A. S. Reese has called a meeting of the Executive committee, to convene at 9:00 a.m. on March 13, at the Chicago Engineers' Club. The purpose of the meeting will be to review the status of committee work and to make preliminary plans for the convention in September.



Any MICHIGAN owner will tell you

—why he bought a Michigan Truck Excavator. It could have been Michigan's famous mobility . . . the heavy duty Michigan truck chassis . . . high yardage through air controlled clutches . . . cast steel turntable base . . . hook rollers . .

But why not let a Michigan owner tell you in his own words. Your local Michigan dealer welcomes the opportunity to show you the most complete line of ⅜ and ½ yard excavators available. It will pay you to get in touch with him *today*.

MICHIGAN
POWER SHOVEL COMPANY
400 Second Street
Benton Harbor, Michigan, U.S.A.

Supply Trade News

General

The **Syntron Company**, Homer City, Pa., has announced the removal of its New York sales and engineering office, formerly located in Long Island City, to 1860 Broadway, New York 23.

Approximately 300 acres of unimproved land near Joliet, Ill., have been acquired by the **Caterpillar Tractor Company**, on which it will immediately start the construction of a new factory for the manufacture of a large portion of the company's line of bulldozers, scrapers, wagons and rippers. While the cost of the facilities, which will include a modern steel fabricating and assembly building, a heating plant and a sewage and water treatment plant, was not disclosed, it is understood that it involves the expenditure of several millions of dollars. **T. R. Farley**, vice-president of the company at Peoria, is slated to become general manager of the new plant.

Personal

William J. Murray has been appointed manager of the Fence department of the **Copperweld Steel Co.**, Glassport, Pa.

J. Karel Huybers has been elected president of **Wendell & MacDuffie Co.**, New York, eastern agents for the **Russell Snow Plow Company** and other manufacturers of railway supplies.

John L. Beven, formerly foreman in the motor car shop of the Illinois Central at Memphis, Tenn., has been appointed eastern field representative of the railroad division, **Mall Tool Company**.

T. D. Sedwick, who recently completed 46 years of service with the Chicago, Rock Island & Pacific, has been appointed manager of the new specialities department of **National Aluminate Corporation,** Chicago. Before joining the firm on February 1, Mr. Sedwick was engineer of tests on the

T. D. Sedwick

Rock Island. As head of the specialities department, he will be primarily concerned with market research, testing and development work on new products which the company expects to produce for railroad and industrial users. He will be assisted by **F. M. Gaughan,** formerly Nalco service representative assigned to the Pennsylvania at Fort Wayne, Ind.

A native of Corning, Mo., Mr. Sedwick received both B.A. and B.S. degrees from the University of Arkansas. In January, 1903, shortly after graduation, he entered Rock Island service, holding various positions, including inspector of metals, chemist and chief chemist. In 1916 he was appointed engineer of tests. As a result of his research and test work on numerous railway supply items, Mr. Sedwick has served on many committees of the Association of American Railroads.

Edward W. Kavanagh, formerly sales manager of the **Ulster Iron Works,** has become associated with the **Manganese Steel Forge Company,** Philadelphia, Pa., manufacturers of rolled and forged manganese steel products. He will be in charge of sales, service and research of their railway division, Southern region, with headquarters in Norfolk, Va.

R. B. Hill, Railway Exchange Building, Chicago, has been appointed sales representative in the Chicago district for the **Achuff Railway Supply Company.** Mr. Hill will represent the company in the sale of Double "U" rail anchors, Hi-Way track spring washers and Tie-Saver pads.

Thomas F. Klein has been elected vice-president of the railroad department and a director of the **Dearborn Chemical Company,** Toronto, Ont. His headquarters will continue at the Montreal (Que.) office of the firm.

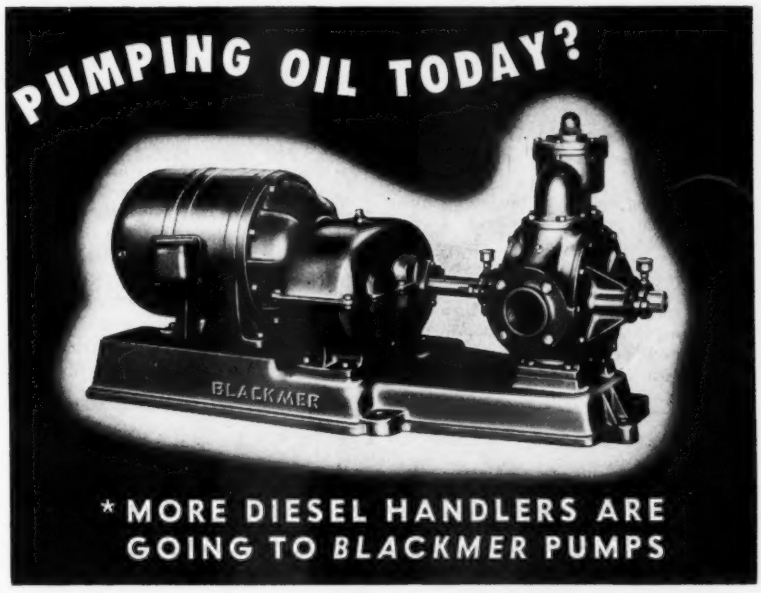
J. J. Hunkele, Jr., formerly district representative, eastern sales division, **Caterpillar Tractor Company,** has been appointed special representative on railroad sales.

William Kusz, supervisor of industrial advertising for **Caterpillar Tractor Company,** Peoria, Ill., has been appointed supervisor of cooperative advertising, succeeding **K. M. Emery,** who has resigned to join an advertising firm at Peoria. Appointed to succeed Mr. Kusz is **Wendell J. Farischan,** news editor of the firm's news service. **Jerry Cook,** news writer, has been advanced to succeed Mr. Farischon, with the title of supervisor of news writers.

Frank Gernand has been appointed direct factory sales representative of **D. W. Onan & Sons, Inc.,** covering the entire west coast and Alaska, with headquarters at Portland, Ore.

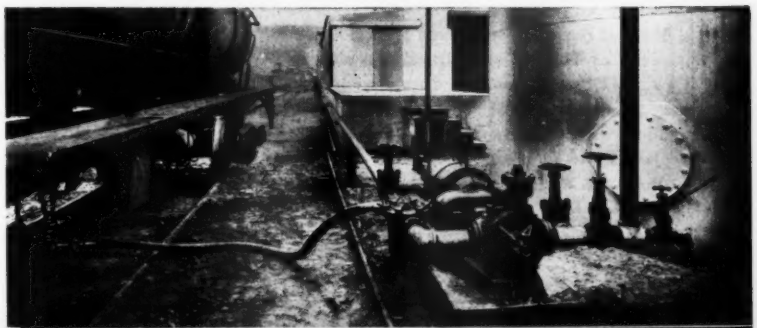
J. C. Elmburg, manager of the Atlanta (Ga.) branch office of **Fairbanks, Morse & Co.,** Chicago, has been transferred as branch manager at Portland, Ore., succeeding **Howard Oxsen,** who is returning to San Francisco as manager of Diesel engine sales in that area. **George A. Hawkins,** manager of the subbranch at Minneapolis, Minn., has been appointed manager of the Atlanta branch office succeeding Mr. Elmburg.

(Please turn to page 296)



Railroads, petroleum marketers, industries and power plants install Blackmer Pumps and forget them. Many installations of 20 years or more daily service have had no maintenance except lubrication. These Blackmer Pumps, long "written off," are still on Blackmer records for "service" if parts are ever needed. Blackmer Pumps with capacities from 5 to 1500 G.P.M. for petroleum products and industrial liquids are "self-adjusting for wear." Users learn pumping costs are lower with Blackmer Rotary Pumps. In 1950, since 1905, Blackmer Pump users will show favorable cost reports.

**Read Why: Write For Bulletin 307—"FACTS"*



BLACKMER PUMP COMPANY – GRAND RAPIDS, MICHIGAN

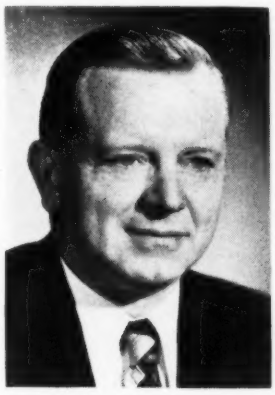
Supply Trade News (Cont'd)

As reported in the February issue **J. S. Crane,** vice-president and secretary of the **Simmons-Boardman Publishing Corporation,** has been assigned to man-

J. S. Crane

age advertising sales for the company's transportation publications, and **J. R. Thompson,** vice-president in charge of advertising sales, transportation papers, in the Western district, has been appointed assistant manager, advertising sales, transportation papers, in addition to his present duties Mr. Thompson was recently also elected a director of the company. Mr. Crane was born at Decatur, Ga., on September 4, 1895, and educated at Tech high school, Atlanta, Ga., and the Georgia Institute of Technology, where he majored in mechanical engineering. Upon leaving Georgia Tech, he entered the United States Army in June, 1917, serving until January, 1919. From October, 1920, to June, 1924, he was connected with the supply catalog division of R. R. Donnelly & Sons at Chicago; from 1925 to 1927 with the McGraw-Hill Publishing Company; and from 1927 to 1930 with Domestic Engineering, a trade publication in the plumbing and heating fields. He joined Simmons-Boardman at Chicago on November 21, 1931, and for the next seven years was engaged in circulation, promotion and sales work for the ***American Builder***, Simmons-Boardman building magazine. In December, 1938, he was transferred to New York as eastern sales manager of ***American Builder***, which position he held until assuming his present assignment. Mr. Crane was elected a vice-president of Simmons-Boardman on February 9, 1942; a director on February 13, 1945, and secretary on August 18, 1948. In addition to managing advertising sales for ***Railway Age***, ***Railway Engineering and Maintenance***, ***Railway Mechanical and Electrical Engineer and Railway Signaling and Communications***, Mr. Crane will supervise research and promotion on all the company's publications. He will continue to maintain headquarters at New York.

Mr. Thompson, who will maintain his present office in Chicago, will report to and assist Mr. Crane in management of



John R. Thompson

advertising sales. An outline of his business career appeared in the June, 1949, issue of ***Railway Engineering and Maintenance***.

William N. Hoelzel has been appointed assistant manager of railroad sales for the Gary Screw and Bolt division of the **Pittsburgh Screw & Bolt Corp.,** Chicago.

The **Homelite Corporation,** Port Chester, N. Y., has announced the creation of four new territories in the southeast section of the country. **Bill Bedford** has been appointed manager of the Memphis (Tenn.) territory, **Ty Lubby** has been appointed manager of the Charlotte (N. C.) territory, **Jim Anderton** has been appointed manager of the New Orleans (La.) territory, and **Norman Supove** has been appointed manager of the Jacksonville (Fla.) territory.

Obituary

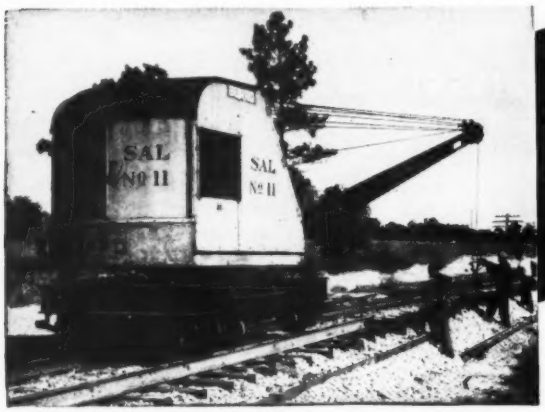
Walter P. Janicki, assistant to vice-president of the Ramapo Ajax division of American Brake Shoe Company, with headquarters at Los Angeles, Cal., died on February 9.

Trade Publications

(To obtain copies of any of the publications mentioned in these columns, use postcards, page 211)

Resurfacing Floors—A six-page folder dealing with the problems of resurfacing various types of service floors has been issued recently by United Laboratories, Inc., Cleveland, Ohio. It describes four general types of materials for renewing old floors, outlines the conditions under which each type of material should be considered, and points out that each type of floor has its individual problems.

(Please turn to page 298)



Rail-Road Specialist

Only Burro Cranes Have:

- Fast travel speeds—up to 22 M.P.H.
- Draw Bar Pull of 7500 lbs. (often eliminates need for work train or locomotive).
- Elevated Boom Heels for working over high sided gondolas.
- Short tail swing—will not foul adjoining track.
- Low overall height—Burro can be loaded and worked on a standard flat car.

We call Burro Cranes "Railroad Specialists" because they do so many railroad jobs so well. Track work, bridge work, bulk materials handling, Mechanical Stores Department, material handling with or without magnet, are only a few jobs Burro does with speed and economy. Burro Cranes are designed for railroad work—not adapted to it. Watch a Burro work and see why it's called on to do so many jobs by most of the country's railroads.

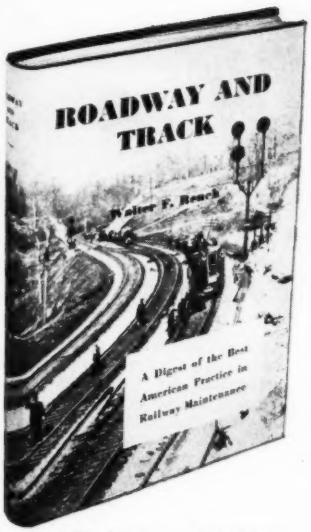
Burro WORK Power means more EARNING Power

CULLEN-FRIESTEDT CO.
1301 S. Kilbourn Ave., Chicago 23, Ill.

With Supplement Bringing
Information Up to July, 1948

ROADWAY AND TRACK

By Walter F. Rench
Formerly Supervisor on the Pennsylvania Railroad;
Author of Simplified Curve and Switch Work



Third Ed. 350 pages, 101 photographs 19 line drawings, 12 tables, index, 6 x 9, cloth, $5.00.

The third edition features the use of the latest mechanical equipment in connection with roadway and track maintenance. Older methods employed where full mechanical equipment is not available are also explained. While most of the methods described are those which are standard on the **Pennsylvania**, A.R.E.A. recommended practices and those in use on other well maintained roads have also been included.

Outstanding types of mechanical equipment used in track work are described and illustrated with action photographs. Engineering drawings show working details. The economies resulting from the adoption of modern methods are clearly outlined. Useful tables have been added to make the book suitable for reference use, as well as a practical handbook on modern methods.

CONTENTS

Part I—ROADWAY: Essential Elements in Roadway Maintenance—The Right of Way—Drainage of Roadbed and Track—Vegetation for Banks—Economics of Roadway Machines—Labor Saving Methods and Devices in Roadway Work—Small Tools and Their Uses.

Part II—TRACK: Essential Elements in Maintenance of Track—Program for Maintenance of Way and Structures Work—The Track Obstruction—Power Machines and Equipment—Labor Saving Methods in Track Work—Track Materials and Their Uses—Practice in Rail Renewals—Practice in Rail Repair and Inspection—Maintenance of Main Tracks—Maintenance of Yards and Terminals.

Part III—SPECIAL PROBLEMS AND DUTIES: Maintenance Problems and Methods Used—Economics of Track Labor—Special Duties in the Maintenance of Way Department.

SUPPLEMENT: A 10-page Supplement describing new A.R.E.A. recommendations and changes up to July 1, 1948, can be cut for insertion in proper place.

Send For Your Copy Today

Send in your order today. If it is not the track book you have been looking for you can mail it back.

For Track Supervisors

While written primarily to serve the needs of track supervisors and other maintenance officers, the new edition contains material of considerable interest to transportation and mechanical officers who require a working knowledge of the fundamentals of maintenance of way practice. Section and extra-gang foremen, who wish to acquire a broader knowledge of their work and of methods used elsewhere, will find the book helpful.

— Ten Days Free Examination Coupon —

Simmons-Boardman Publishing Corporation
30 Church Street, New York 7, N. Y.

Please send me on Ten Days Free Examination a copy of the Third Edition of ROADWAY AND TRACK by Walter F. Rench. If satisfactory, I will remit the list price of $5.00. Otherwise, I will mail the book back postpaid, without obligation.

Name .....

Address .....

City .....**State** .....

Company .....**Position** .....

This offer is limited to retain customers in the United States

R. E. & M. 3-50

Trade Publications (Cont'd)

Green Light to Railroading Profits—The Caterpillar Tractor Company has issued a 12-page illustrated booklet discussing the use of Caterpillar equipment in such railway maintenance work as snow removel, track relocation, ditching, roadbed leveling, tie removals, and general earth moving. It emphasizes such factors as low cost, versatility of equipment, high production, good application, and dependability.

Flintkote Products—Three new product data sheets have been published by the Flintkote Company, Industrial Products Division, New York. The sheets describe Flintkote Trowel Mastic, a solvent type asphalt coating used for water resistance on the interior surfaces of exterior masonry walls; Flintkote Semi-Mastic, a similar material for brush application; and Flintkote Plastic Cement, a heavy-consistency asphalt cement for repairing roofs, leaks, and cracks in masonry.

Fiberglass Thermal Insulations—This is the title of a new, 16-page illustrated booklet published by Owens-Corning Fiberglass Corporation, Toledo, Ohio, describing all forms of Fiberglass insulation products for industrial and building applications, including its use in low-temperature structures. Data on thermal conductivity and sound-absorption properties of those materials, as well as tables giving specifications of each type of insulation, are also included.

Blue Brute Compressor—The Worthington Pump and Machinery Corp., Harrison, N. J., has published an illustrated folder showing the use of 60 c.f.m. Blue Brute Hand-I-Air compressors in railway maintenance work. Included is a tabulation of the various air tools and tamping bars that may be used with this machine.

Materials Handling Attachments—The Hyster Company has published a 28-page illustrated catalog describing its various attachments, tools and accessories designed to lower costs and increase the ease of handling materials with Hyster lift trucks, straddle trucks and mobile cranes. The catalog contains model views, diagrams, specifications, action pictures, and cartoons.

Water Conditioning Equipment—The Graver Water Conditioning Company, New York, has outlined its products and services in an eight-page, illustrated bulletin, just released, which explains the scope of Graver activities in the fields of research in water conditioning for boiler plant, process work and general industrial and municipal use. The illustrations include views of large installations of hot-process and zeolite softeners, demineralizers, etc., produced by this company.

Cut the cost of RIGHT-OF-WAY and STATION MAINTENANCE with GRAVELY *POWER* EQUIPMENT!

48" SNOWPLOW

POWER BRUSH

MOWER

SNOW REMOVAL . . . Clear docks, platforms and drives quickly with the 48" Snow Plow Attachment for the powerful 5-HP GRAVELY. One Snow Plow does the work of eight men—proved in user tests.

POWER SWEEPING . . . Keep stations, walks and drives shining with the Rotary Brush Attachment. 38" of sweeping width, replaceable brush segments, gear driven. Sweeps CLEAN the first time over.

MOWING . . . Mow right-of-ways and lawns economically with the GRAVELY mowing attachments. Rotary Mower for station lawns, Sicklemower for right-of-ways. Extension axles allow efficient work on 60 degree slopes.

SAVINGS in maintenance cost are an old story to GRAVELY users. Ask us for details about our 17 attachments. SERVICE is always available, anywhere, for the GRAVELY . . . and the GRAVELY has a REVERSE, DIRECT GEAR DRIVE, 5 HP.

GRAVELY
MOTOR PLOW & CULT. CO.
Box 342
DUNBAR, W. VA.

SEND FOR NEW FREE CATALOG

BETTER MEASURE WITH LUFKIN

Never Before A Steel Tape Like The "Ranger" . . . Exclusive Chrome-Clad Satin Finish Enables You To *See Right—Be Right!*

EASY TO READ MARKINGS THAT ARE DURABLE

It's exclusive with *Lufkin* . . . the Chrome-Clad satin finish that banishes disturbing glare . . . assures accurate measuring under all light conditions! Black markings stand out razor-sharp against the chrome white background . . . makes it easy to *See Right—Be Right!*

Lufkin "RANGER" Features:

1—Chrome-Clad line . . . will not chip, crack, or peel.

2—Detachable sturdy ¼-in. line resists wear, corrosion.

3—Permanent easy-to-read black markings . . . available in feet, inches and eighths; or feet, 10ths and 100ths.

4—"Instantaneous Reading"—zero falls at end of line. Accurate!

5—Genuine leather case—rust resistant steel liner.

6—With two improved pattern detachable finger rings.

7—Superior roller throat, folding flush handle opened by push-pin.

DIAGRAMMATIC CROSS-SECTION VIEW

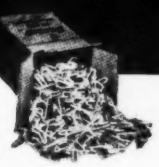
1. Hardened Steel Tape. 2. Rust-resistant Coating. 3. Multiple Coats of Electroplating. 4. Hard, Smooth, Non-Glare Chrome-Plating. 5. Black Markings Bonded to Steel, Sunk below Surface.

Get a LUFKIN "RANGER" . . . a "better buy" in every way, and get measuring satisfaction for years to come. See It—Buy It . . . at your nearest LUFKIN Dealer.

Buy LUFKIN

TAPES • RULES • PRECISION TOOLS
THE LUFKIN RULE CO.
SAGINAW, MICH. • NEW YORK CITY • BARRIE, ONT.

Stretch and repair barbed and woven wire, both old and new, with this simple tool. Tighteners remain in fence and may be retightened any time.

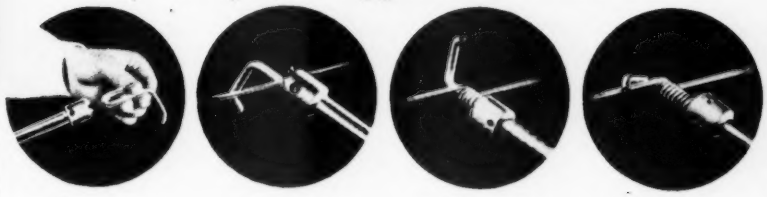


Tighteners in 10 lb. and 25 lb. cartons.

Fence Problems Made Easy!

BENBOW FENCE TIGHTENER

Simple — Effective — Fast

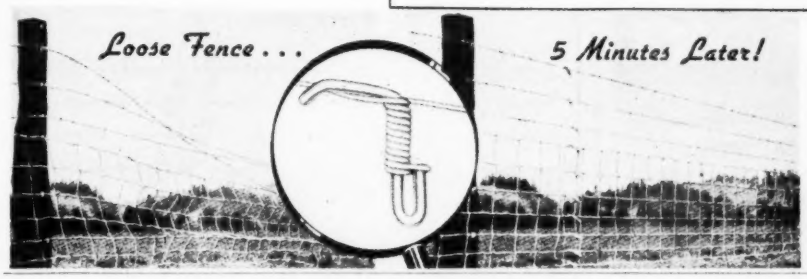


Insert Tightener in Wrench

Place on Fence Wire

Wind up Slack

Hook . . . Then Remove Wrench From Tightener



Sag or break in electric fences easily fixed. Saves time, saves labor. Order now!

BENBOW Fence Tightener Co.

BENBOW, CALIFORNIA

Cut Costs, Speed Work

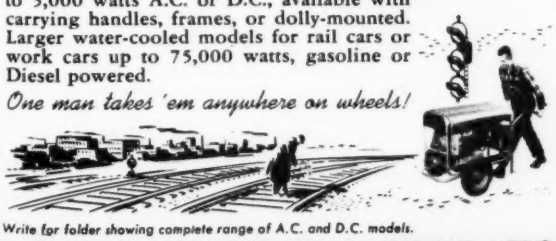
on Construction and Maintenance Jobs!

with **ONAN** *Portable* **ELECTRIC PLANTS**

5 KW D.C. model with carrying frame.

Take an Onan portable electric plant to every right-of-way maintenance or construction job! It will supply quick "plug-in" electric power for cost-cutting, fast-working electric tools—drills, saws, nut runners, grinders, pipe threaders or any motor-driven equipment. Lightweight models from 400 to 5,000 watts A.C. or D.C., available with carrying handles, frames, or dolly-mounted. Larger water-cooled models for rail cars or work cars up to 75,000 watts, gasoline or Diesel powered.

One man takes 'em anywhere on wheels!



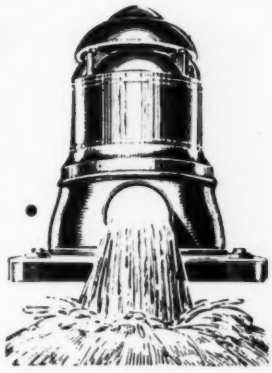
Write for folder showing complete range of A.C. and D.C. models.

D. W. ONAN & SONS INC.

4570 Royalston Ave. • Minneapolis 5, Minn.

LOWER COST OPERATION

Longer Life



Layne well water systems are designed and built to produce much greater volumes of water than can be obtained from the conventional type of installation. Skillful designing and precision manufacture of the Layne Vertical Turbine pump used in these systems give extra high efficiency. The results are: more water—less cost and longer life for the unit. Furthermore, Layne well water systems are so ruggedly built that upkeep cost is almost nothing.

Thousands are now serving cities and industries throughout the world.

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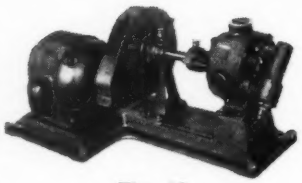

Fig. 12

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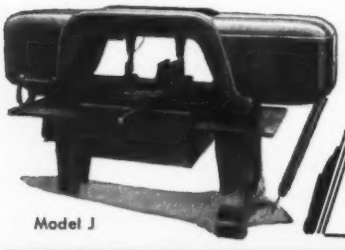

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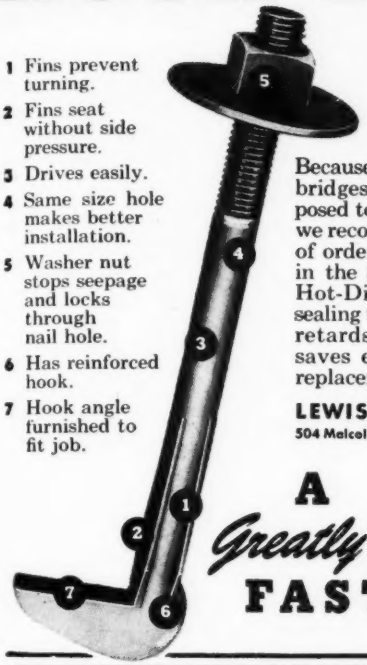

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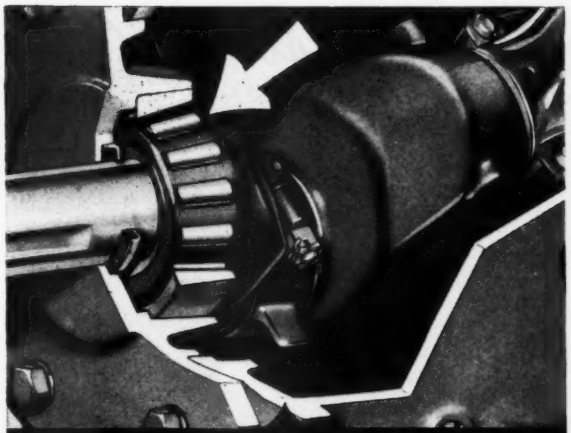

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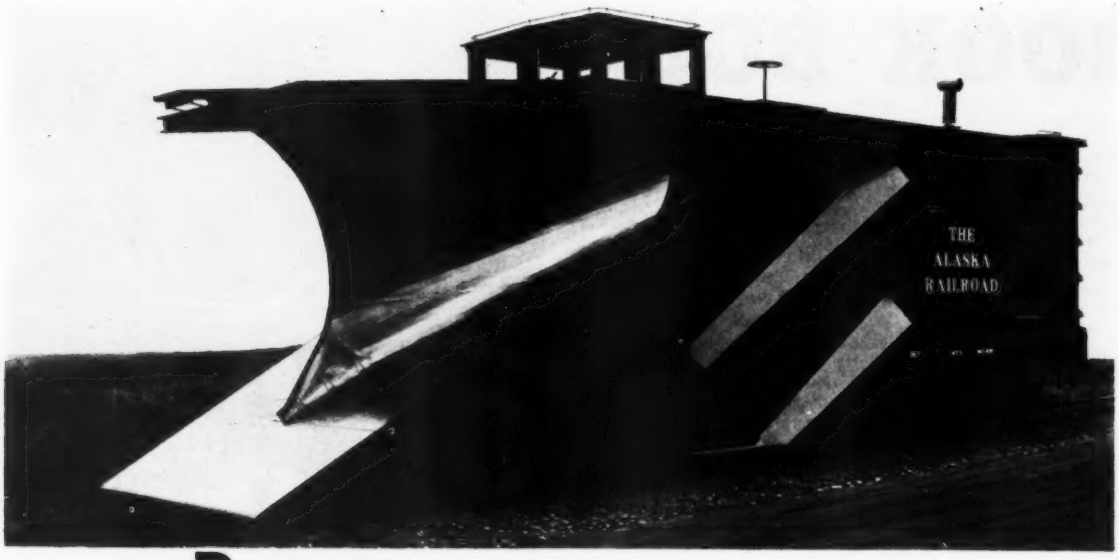

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